November, 1947

THE FOUNDRY

wherever metals are cast...

A MODERN Swivel Cupola Charger serving 2 cupolas at the Brillion Iron Works.

MODERN EQUIPMENT CO.
PORT WASHINGTON, WISCONSIN

TURN TO PAGE

FACING INSIDE BACK COVER

PURITE'S CONSUMPTION CHART *continues* TO REFLECT FOUNDRYMEN'S APPROVAL!

99% PURE FUSED SODA ASH

PURITE

The Scientific Flux for Better Melting and Cleaner Iron

The steady climb of this consumption chart over a 20-year span shows what foundrymen think of Purite . . . *proves* the value of this scientific flux in refining cupola cast iron.

•

PURITE'S remarkable action in desulfurizing and refining iron in the ladle or in the cupola hearth—its effect on combustion—and its action in smoothing out cupola melting operations are the reasons behind the ever-increasing use of Purite by progressive foundrymen everywhere.

Purite does *more* than remove sulfur; it purges molten metal of occluded gases, entrained oxide-silicates and other non-metallic impurities that may cause pinholes, gas pockets and segregated defects. Refining with Purite increases the strength . . . improves grain structure and machinability . . . speeds production of cleaner, sounder castings.

A survey shows that over 70% of the foundries in four principal casting centers in the North, South, East and Midwest are using Purite regularly. You'll want to learn how Purite helps them—how it can help you in these increasingly competitive days, so write for free factual information. *The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, N. Y.* In Canada: Railway & Power Engineering Corporation, Limited.

Mathieson
CHEMICALS

Purite (Fused Soda Ash) • Liquid Chlorine • Caustic Soda • Soda Ash • Bicarbonate of Soda • Ammonia, Anhydrous & Aqua • Sodium Chlorite Products • Chlorine Dioxide • HTH Products • Synthetic Salt Cake • Dry Ice • Carbonic Gas • Sodium Methylate

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OCT 31 1947
DETROIT

You'll be glad you remembered *Purple Strand*

It's a Bethlehem wire rope that's especially good for foundry use. Strong, tough, and stubbornly wear-resistant.

We've known cases where it lasted so long that the buyer forgot the brand name. Had to look it up when he wanted to order more.

When you need to rerope your cranes or hoists, remember Purple Strand. It's a name that means the best in wire rope.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

When you think WIRE ROPE . . . think BETHLEHEM

AWAY OUT IN FRONT!

Naturally...because Federal

GREEN BOND

is the best of the Wyoming Bentonites

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant — Mines

CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, WYO.

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NOVEMBER 1947

VOLUME 75 — NUMBER 11

	Page
Editorial	65
Casting Artistic Bronzes By PAT DWYER	66
The Chipping Operation By R. E. CHAPMAN	72
New Gray Iron Foundry Combines Efficiency and Cleanliness By WILLIAM G. GUDE	76
Visual Analysis of Sand Grain Distribution By C. A. SANDERS	82
Controlling Costs by Production Centers By ARTHUR A. CLAY	85
Permanent Mold Casting of Aluminum By EDWIN BREMER	86
Gray Iron Founders Meet in 19th Annual Convention By WILLIAM G. GUDE	90
Belgian Foundries By VINCENT DELPORT	92
Reliability of Test Bar Properties as a Measure of the Quality of 85-5-5-5 Alloy Melts By L. W. EASTWOOD and J. G. KURA	94
International Committee Meets During Belgian Congress By VINCENT DELPORT	114
Around Detroit By ARTHUR H. ALLEN	120
Foundry Equipment Manufacturers Hold Annual Meeting	128
Man-to-Man on the Molder's Bench By RALPH L. LEE	134
Use of Exothermic Cores In Pouring Stainless Steel By MAURICE BEAM	140
The Adventures of Bill By PAT DWYER	192

Questions and Answers	100	Industry Briefs	174
Men of Industry	104	Readers' Comment	188
Foundry Data Sheet	117	Equipment and Supplies	240
Foundry Developments	126	New Trade Publications	252
Foundry Group Activities	152	Manufacturers' Literature	269
Obituary	166	Where-to-Buy Directory	280

Advertisers' Index 299

PRODUCTIVITY...

WEHR STEEL COMPANY

MILWAUKEE WISCONSIN

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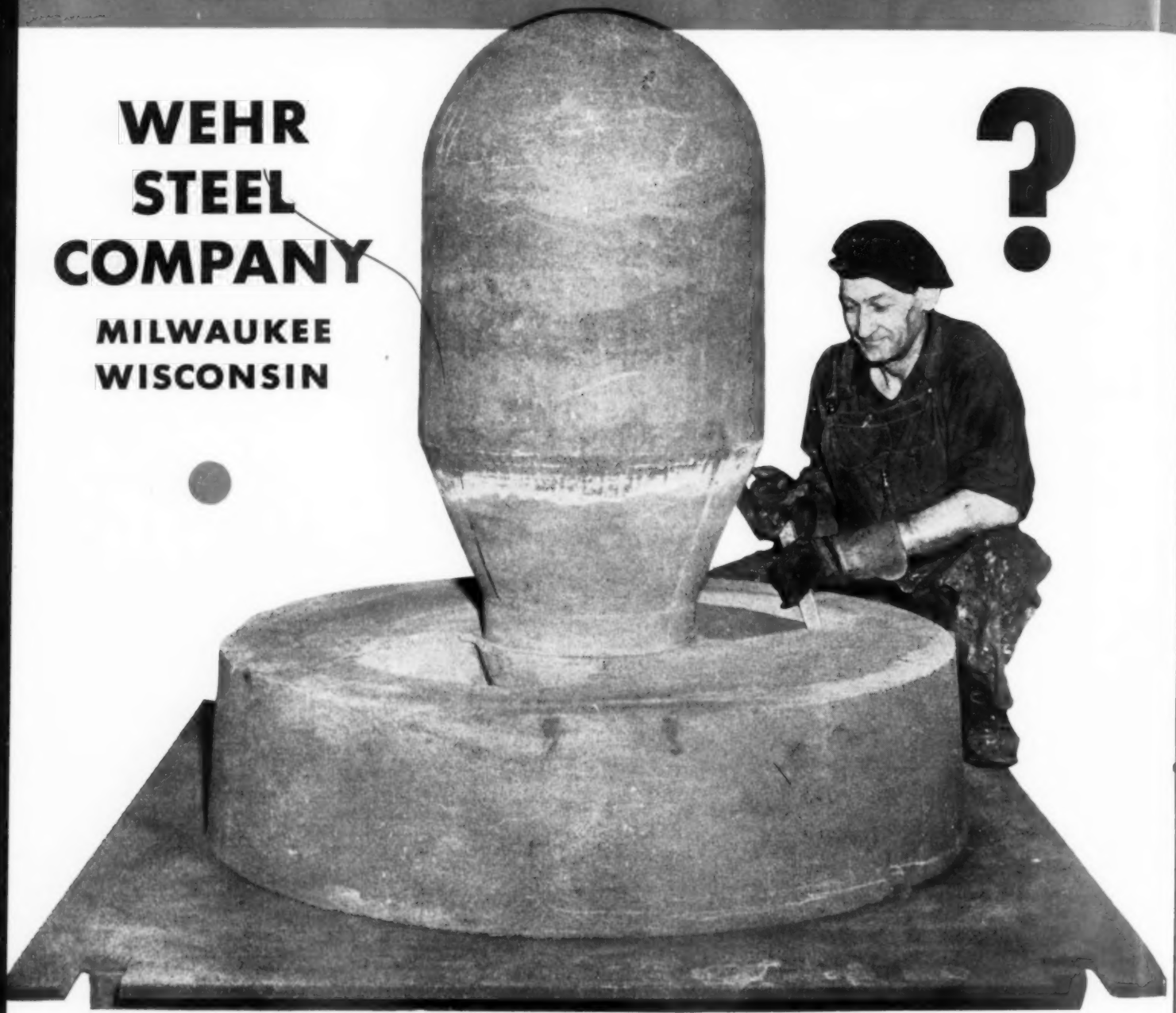
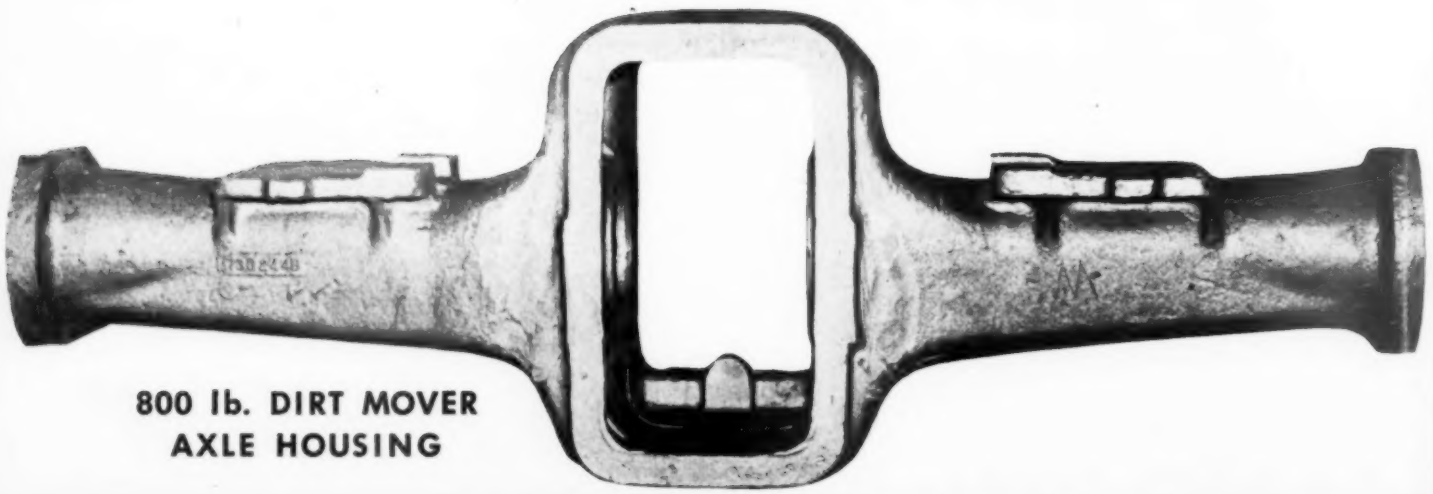




800 lb. DIRT MOVER AXLE HOUSING

key to today's problems

Challenging both management and labor is the problem of increasing output of work per man hour—through more efficient utilization of men, methods, machines, and materials.

On a national scale,—greater productivity is needed to keep costs and prices in line. To each foundry,—greater productivity means lowered costs and a greater margin of profits.

Wehr Steel Company took a big step toward increased output by adopting a faster baking core oil. No capital outlay or extra expense was required. The result: more cores in less time! How? Less oven time required to thoroughly bake out cores. Core oven capacity was expanded. More cores baked per day resulted in more castings poured daily. LINOIL 38 helped Wehr achieve their goal by getting increased production from present equipment.

No premium required for this extra output. Just LINOIL 38. A high strength, fast baking core oil that gets more done. Users regard 38 as a quick, sure means of increasing core oven production at no extra cost.

Steel, gray iron, alloys, and non-ferrous, all look to LINOIL 38 for increased oven output and greater productivity. SAFEGUARD PROFITS with INCREASED PRODUCTIVITY... INVESTIGATE 38!

400 lb. AXLE HOUSING CORE

BLOWN LOCOMOTIVE BEARING CAP CORES

THE LINOIL THE LOGICAL OIL

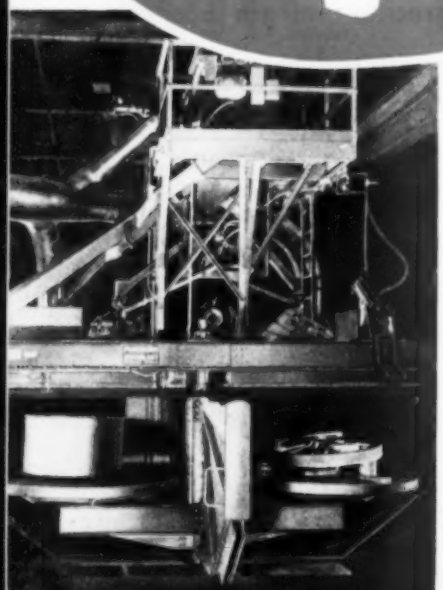
THE WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET

CLEVELAND 2, OHIO

Pangborn



Turn-Style" Table with door open showing both tables.

nother Pangborn ROTOBLAST ible with auxiliary tables set for axle shot peening.

The Penn Steel Castings Company has to clean large, bulky steel castings . . . a stove manufacturer wants to clean flat and fragile castings . . . a valve maker must have high production on a single item . . . a manufacturer needs a perfect cleaning job before enameling . . . another foundry cleans miscellaneous castings from 10 to 75 pounds.

Each one found the answer to his problem in a Pangborn ROTOBLAST* Table — the versatile table that can be adapted to handle a variety of work.

Pangborn's answer to Penn Steel's problem of cleaning heavy, bulky castings quickly is the "Turn-Style" Table shown at right. This Table cleans and loads simultaneously as one of the "Turn-Style" Tables is always inside the cabinet while the other is in loading or unloading position. (Picture at left). Typical of results produced by this machine is the cleaning of anchors — their most difficult job. Where it formerly took *two* men *eight* hours to clean one anchor it is now done on the "Turn-Style" Table in *15 minutes.*

Your metal-cleaning jobs may also be solved by Table Cleaning with the Pangborn ROTOBLAST unit that blast cleans uniformly at high speed using metal abrasive propelled by centrifugal force.

Write for new Bulletin No. 215 on Pangborn ROTOBLAST Tables. For information on Barrels and Special Cleaning machines, "come to PANGBORN" —

"More Than 25,000 Pangborn Machines Serving Industry"

PANGBORN CORPORATION

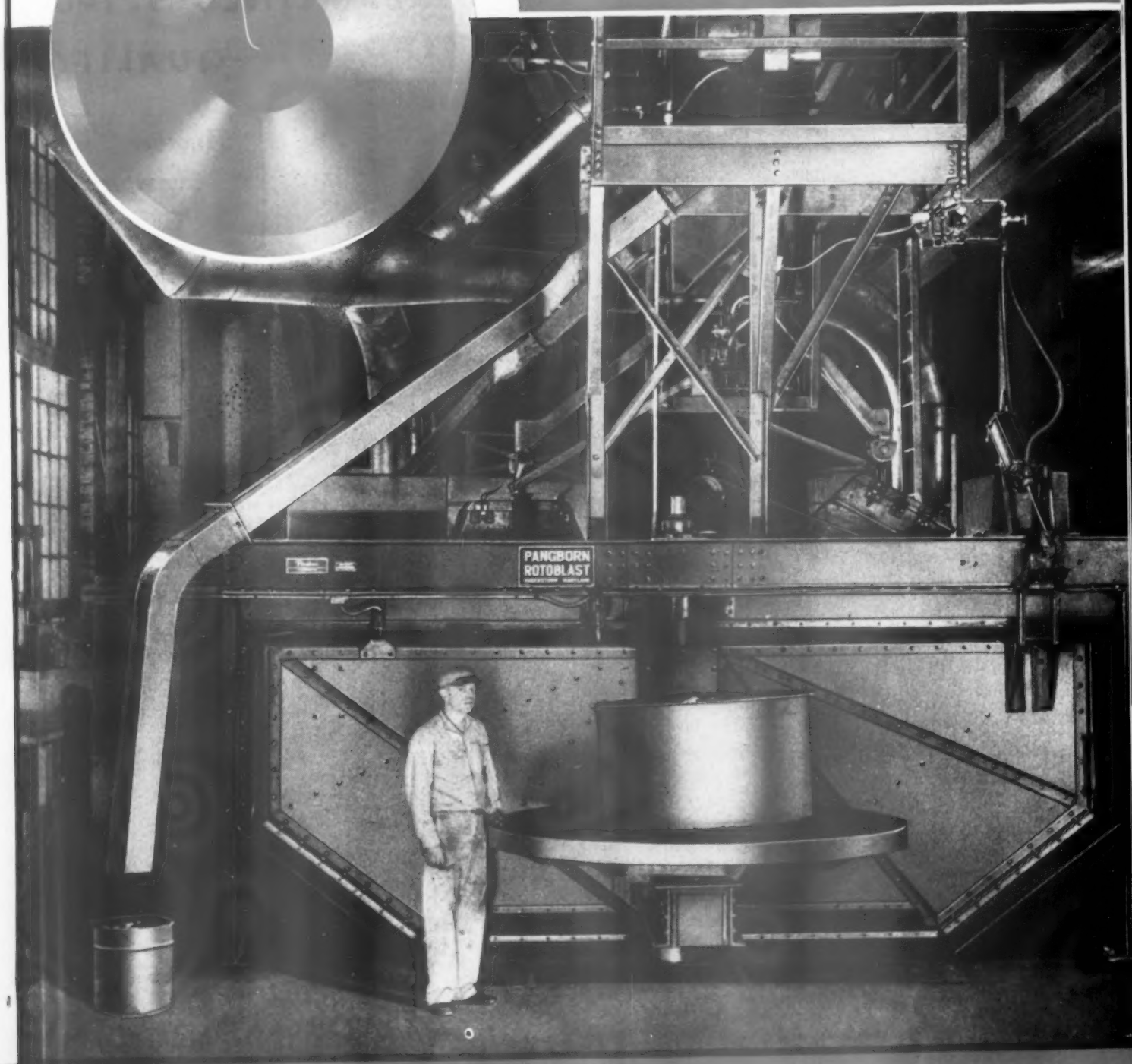
1300 Pangborn Boulevard, Hagerstown, Maryland

*Trademark of the Pangborn Corporation

Pangborn PANGBORN CORPORATION HAGERSTOWN MARYLAND **Blast Cleans Cheaper**

ROTOBLAST*

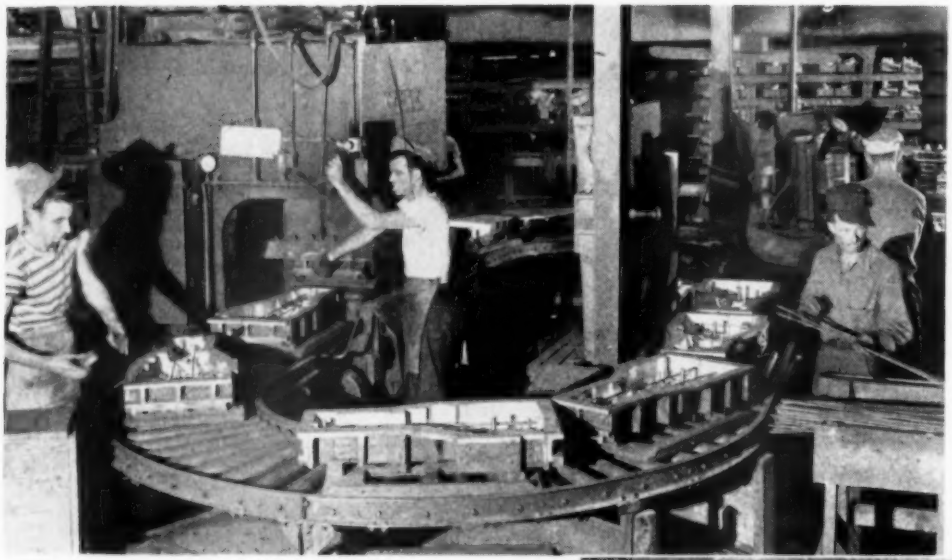
SETS THE TABLE TO FIT THE OCCASION



With the Right Equipment for Every Job

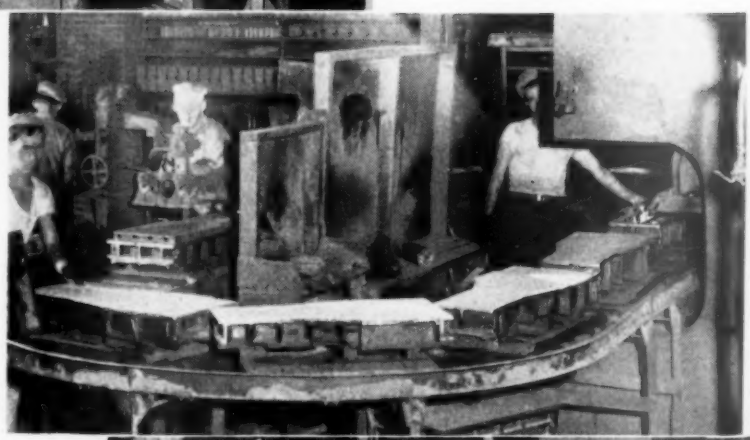
Champions

STREAMLINED SET-UP QUALITY



Another * *Champion Case Story*

* *Did you see the story of Champion Core Blowers and Molding Machines in our September advertisement?*



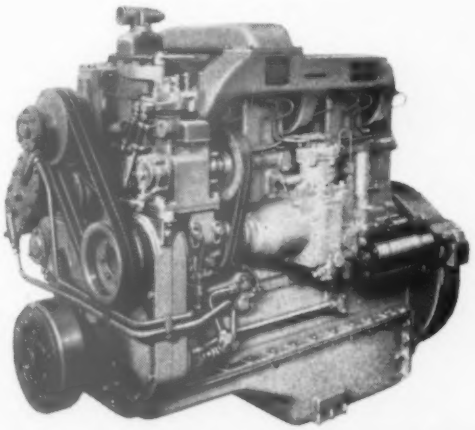
INGENUITY plus modern standard equipment enables Golden Foundry Company to utilize the full productive capacity of Champion Core Blowers, and to supply uniformly high quality castings for Cummins Diesel engines.

Illustrated here is the operation of producing cores for the six-cylinder engine block, a one-piece casting. Twelve core boxes move on a roller conveyor forming a closed loop, past the men who insert rods, pins and loose pieces, then under the Champion CB400 Core Blower, where they are filled, then to a roll-over machine. This inverts the core box onto a straight section of conveyor, where the core is left for finishing, the box being returned to the loop.

Finishing consists of spraying with blacking and stacking on truck for drying. Nine men form the crew on this production line, and easily produce a week-by-week average of 150 core sections per hour. Each section weighs 50 lbs.

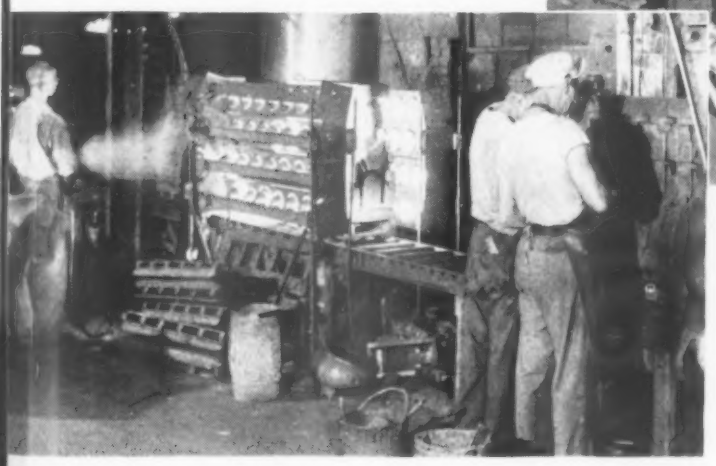
Score Again!

ACHIEVES VOLUME AND ON INTRICATE CORES!



Cummins Diesel Engine, Model NHBS-600 6 cylinder developing 275 hp at 2100 rpm.

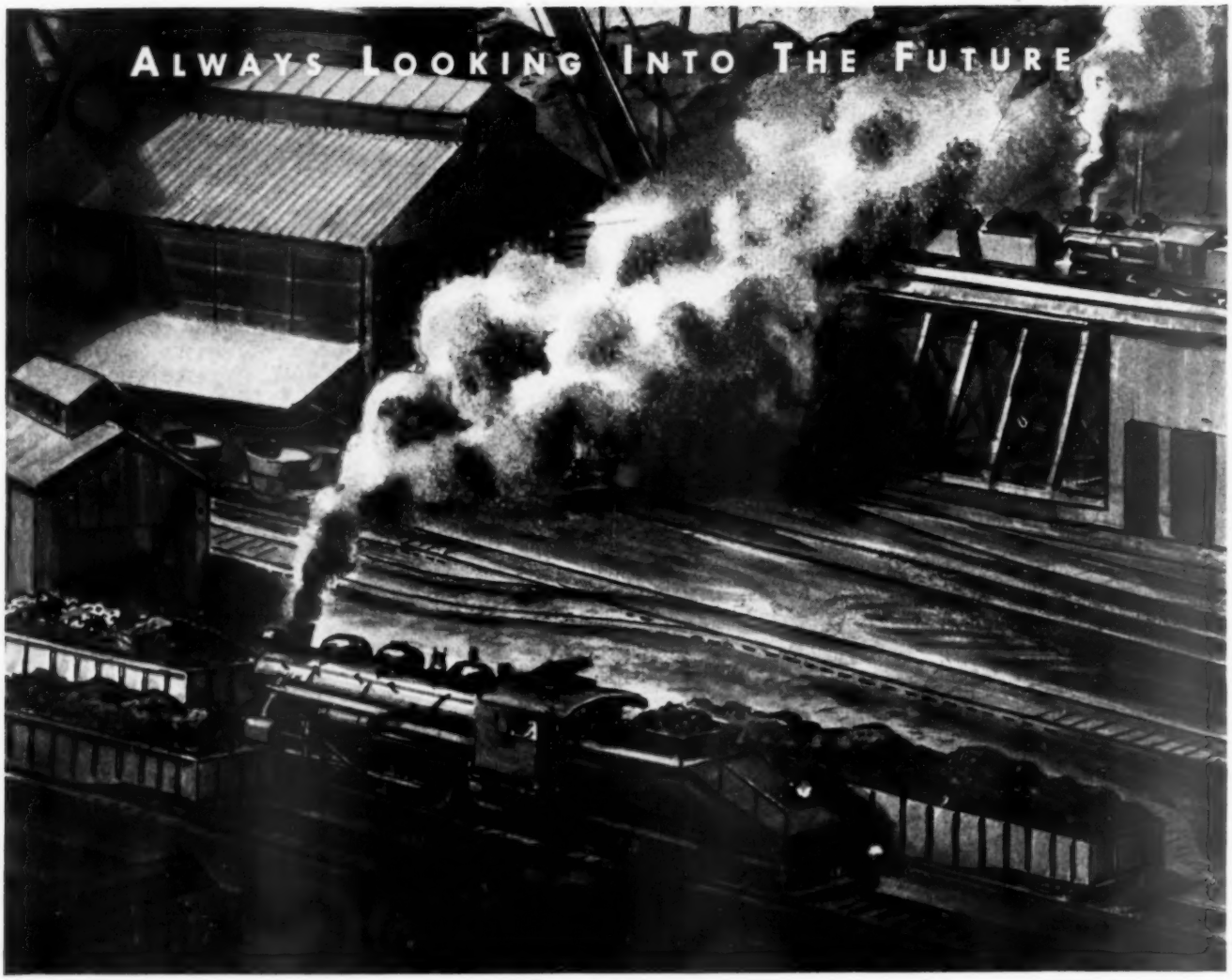
Here the sections are assembled into a 600 pound unit. Smoothing and touching up with blacking make it ready for drying under infra red lights. The operator at the far left gives the finishing touches with a gas flame which reaches the inner surfaces where direct rays of the lamps cannot penetrate.



In both job foundries and production foundries, standard Champion machines are giving results equal to special set-ups, demonstrating in striking fashion the unusual power, speed and ease of operation which Champion knowledge and experience has incorporated in these machines. There's something about Champion Machines that seems to make it easier to do more work, better work, with less effort.

How about a few Champions on YOUR team?

CHAMPION FOUNDRY AND MACHINE CO.
1318 W. 21st STREET CHICAGO 8, ILLINOIS



a new plant for producing oxygen in tonnage quantities

The first plant designed for the commercial production of low purity oxygen in tonnage quantities is now nearing completion. It was designed by Air Reduction and is being installed to supply oxygen to a steel plant for metallurgical purposes. Operation of this plant will provide accurate determination of manufacturing procedures in producing such oxygen, and allow exploration of large scale applications of this new product to iron and steel manufacture.

The giant steel industry is one of the important fields in which the use of tonnage oxygen is being studied for the purpose of speeding production and reducing manufacturing costs.

This is another outstanding example of Airco's policy of pioneering time-saving and product-improving processes that are useful to industry. The experience and facilities of our Technical Sales and Research Divisions are at your disposal in applying Airco techniques to your manufacturing problems.

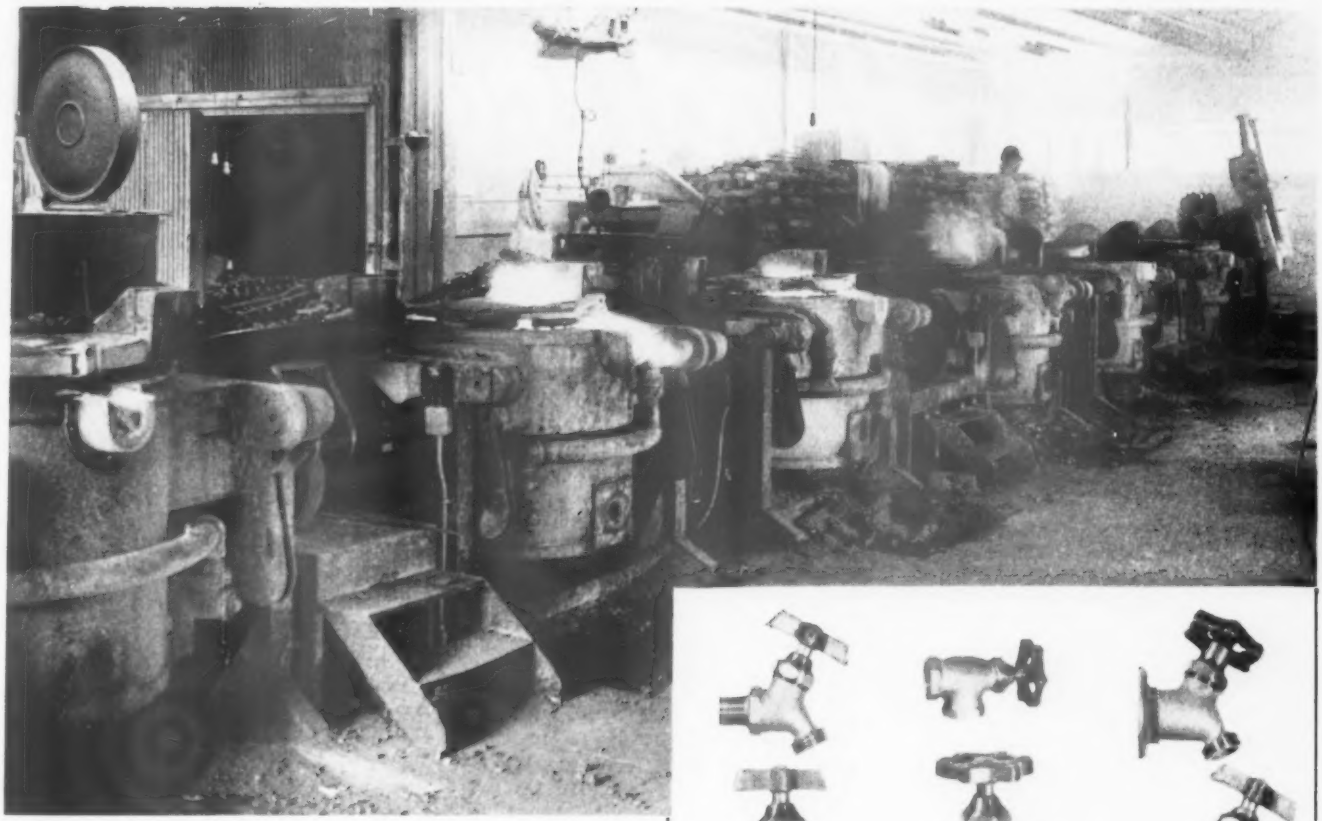
* * *

If you are interested in obtaining further information, please address: Technical Sales Division, Air Reduction, 60 East 42nd Street, New York 17, N. Y.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

Originators of Modern Oxyacetylene Flame and Electric Arc Methods For ALL Industry



Typical plumbing fittings manufactured by Price-Pfister

Fisher Furnaces

HELP PRICE-PFISTER REDUCE METAL LOSS BY 85%

Price-Pfister, Los Angeles, well known manufacturer of plumbing supplies, in 1943 installed the first of 7 new Fisher Gas Fired Nose Pouring Crucible melting furnaces. These furnaces used for melting red and yellow brass alloys required for the manufacture of valves, fittings, faucets, etc., replace old style open flame furnaces.

Because there is no open flame to impinge on the surface of the metal to cause burn out, metal loss is drastically reduced.

Don Harper, foundry superintendent at Price-Pfister says: "*With the new Fisher Furnaces* our metal loss has dropped to about 15 pounds per ton. Our loss with the old furnaces ran to about 100 pounds a ton—so we save an extra 85 pounds. Brass is selling for 18½c a pound, so we save over $15.00 on each ton."

Scrap loss also reduced. Oxidation and resultant slag impurities are minimized because metal being melted is in a crucible, and is never exposed to an open flame. Absence of impurities greatly improves fluidity and makes it possible to pour at lower temperatures. This results in better castings and drastically minimizes scrap loss.

Special Features

OF FISHER GAS FIRED NOSE POURING FURNACES

- Constant pouring arc regardless of degree of furnace tilt.
- Rate of pouring under positive and constant finger-tip control.
- Special trunnion mounting permits lower construction than hand tilting furnace.
- Reduced height facilitates charging cold metal and observation of melting.
- Metal waste and pouring hazard greatly reduced by closeness of ladle to pouring spout.
- Labor saving—simple control enables one man to pour and transfer metal.

For more detailed information, request bulletin 57A

Now . . . A complete line of melting and holding furnaces—gas, oil, electric

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 WEST HUBBARD STREET • CHICAGO 12, ILLINOIS

Here's Headline News!

DELTA

PERMI-BOND

THE MODERN, SCIENTIFIC SEA COAL REPLACEMENT

...now used in many of the NATION'S LEADING FOUNDRIES

Delta Permi-Bond is a specially prepared pure hydrocarbon, completely volatile at elevated temperatures. It decomposes to form a vapor-gas cushion, which is reducing in nature, and leaves only a trace (two tenths of 1% maximum) of ash.

Note these important advantages and SEND FOR A LIBERAL SAMPLE. You will also receive complete information on HOW TO USE DELTA PERMI-BOND in your foundry:

1. Always uniform. Manufactured under rigid chemical and physical control.
2. Eliminates ash and free carbon which contaminate your sand.
3. Greatly reduces gas, smoke, soot and dirt in the foundry.
4. Provides correct amount of vapor gas in the mold cavity, which prevents casting blows and also allows use of lower permeability sand.
5. Increases dry strength of sand 75% to 90%.
6. Prevents scabbing, buckling, rat-tailing and cutting which greatly reduce scrap castings.
7. Improves casting finish, which cuts cleaning room costs to a minimum.
8. More economical to use; reduces your sand costs.
9. Much cleaner and more foolproof to use than sea coal.

DELTA OIL PRODUCTS CO.

Manufacturers of **FOUNDRY PRODUCTS,**
Industrial and Automotive Oils, Greases and Compounds
MILWAUKEE 9, WISCONSIN

HOW to CHARGE a CUPOLA

If labor in your locality is plentiful—and *cheap* . . . if there are plenty of men willing to work in the sweat and grime of a hot charging floor . . . if costs per ton and control of analysis are relatively unimportant in your operations—then you can probably afford to keep on charging by hand.

But many foundries are rapidly changing over to mechanical charging because they feel the need of reducing costs, controlling output, and improving working conditions.

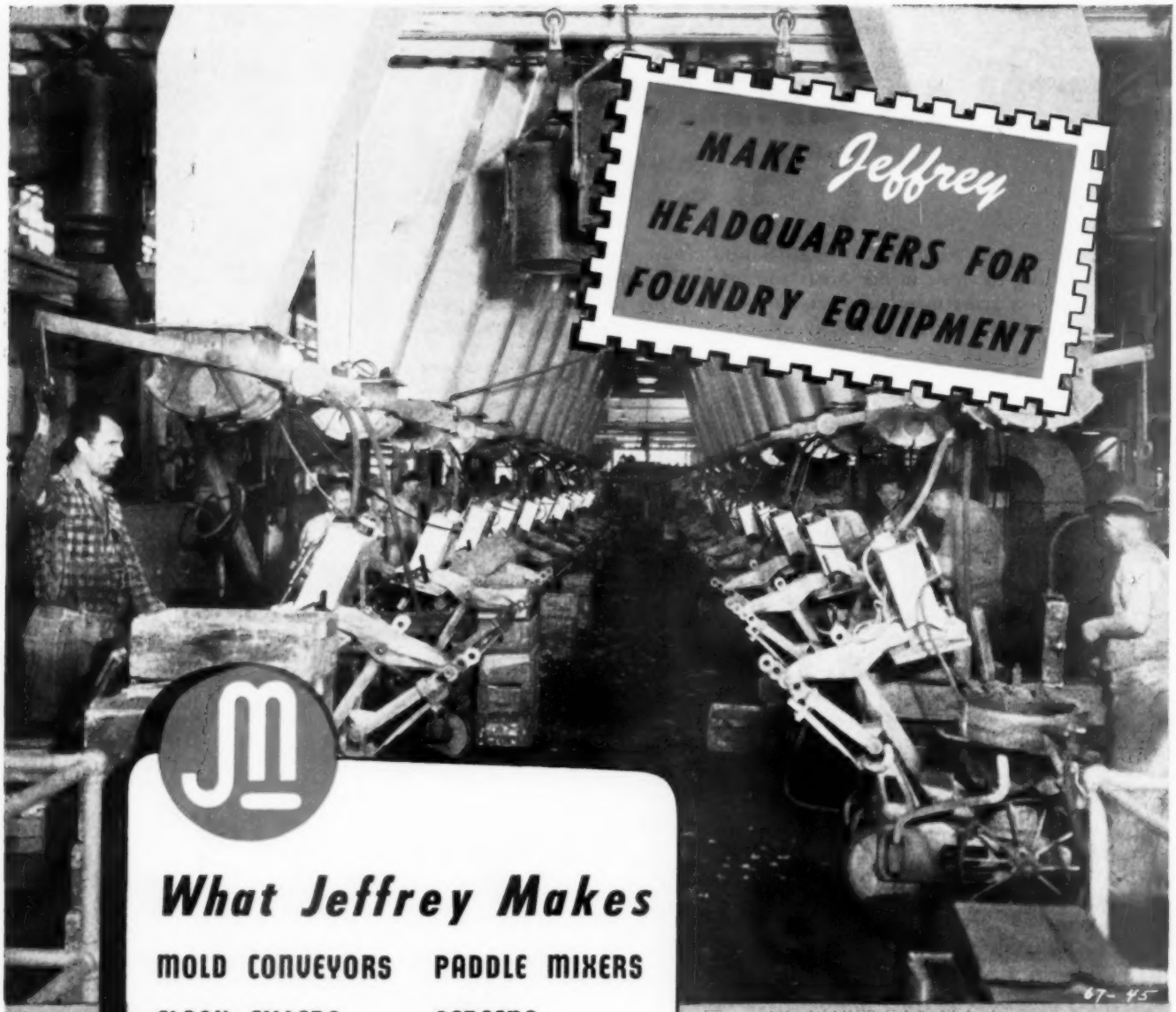
As the leading exponent of mechanical charging, Whiting supplies every type of equipment which has been proven practical—from simple skip hoists for individual cupolas to swivelled skips and crane type chargers for multiple cupola installations. Ask Whiting engineers to survey your plant and requirements, and offer recommendations.

WHITING
CORPORATION
15607 Lathrop Avenue, Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

RIGHT: Vertical side-dump skip hoist charges the cupola in a small foundry.

BELOW: Swivelled inclined skip charger serves three cupolas. It has double-leaf drop-bottom bucket.



THE JEFFREY MANUFACTURING COMPANY

907-99 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

Do Your Men Dress Like This?

FOR SAND BLASTING AND CORE KNOCKOUT?

— Turret gun, operated from outside, directs sharp stream of water (1200-1600 psi) upon casting mounted on rotating table.

This man is removing cores and cleaning castings both inside and out in one easy operation.

It's Pangborn's new HYDRO-SAND BLAST AND CORE KNOCKOUT—a wet blast machine that eliminates handling and hazards and cuts costs.

Notice how clean the installation is . . . the absence of protective clothing . . . the convenient controls.

For further operator convenience, the room is floodlighted and the windows are flushable. Where desirable, the room is furnished with retractable roof for crane handling of the work. For further cost savings, the core sand is reclaimed and core rods removed without damage.

Have us give you more information for your particular work. Write to Pangborn — "More than 24,900 Machines Serving Industry . . . Symbol of Quality Since 1904."

Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland.

BLAST CLEANS CHEAPER
with the right equipment for every job

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

Tabor asks...

"why not buy the machine w

THAT'S a question that makes sense to foundrymen. Especially so, when you see the results from the mechanical "brain" in action—molds, each like the other in density and uniform perfection—more of them quicker—and all simply by touching a finger to a control button.

Tabor designed this Trunnion Jar-Squeeze Rollover Pattern-Draw Machine so the machine itself, not the operator, is responsible for mold perfection. Jarring blows, squeeze pressure and pattern draw are electrically controlled. Set it to job requirements and it "follows instructions" implicitly, mold after mold, day after day . . . with costly items like operator error or fatigue practically eliminated.

Make this husky machine prominent in your plans for highest production on long-run operations. You'll like the way its low maintenance, long-life and reliable performance shorten your problem list.

Special Master Switch and Control Unit Features

- Control buttons arranged in sequence of use with one button for each operating cycle.
- Jarring is push-button controlled from start to finish. Number of jarring blows automatically timed to meet needs.
- Squeeze and pattern-draw operations are electrically controlled, with squeeze pressure uniformly held to predetermined needs.

SPECIFICATIONS

Length of Rollover Plate	33"
Maximum Width of Flask	24"
Space available for Pattern Board, Flask Depth, Bottom Board and Pattern Draw	24"
Piston Stroke	13½"
Jolt Cylinder	6"
Squeeze Cylinder	16"
Capacity	1000#

Furnished with electrical controls including jolt timer and squeeze pressure regulator. Strike-off arm available at no extra cost. Other sizes and capacities upon inquiry.

REPRESENTATIVES

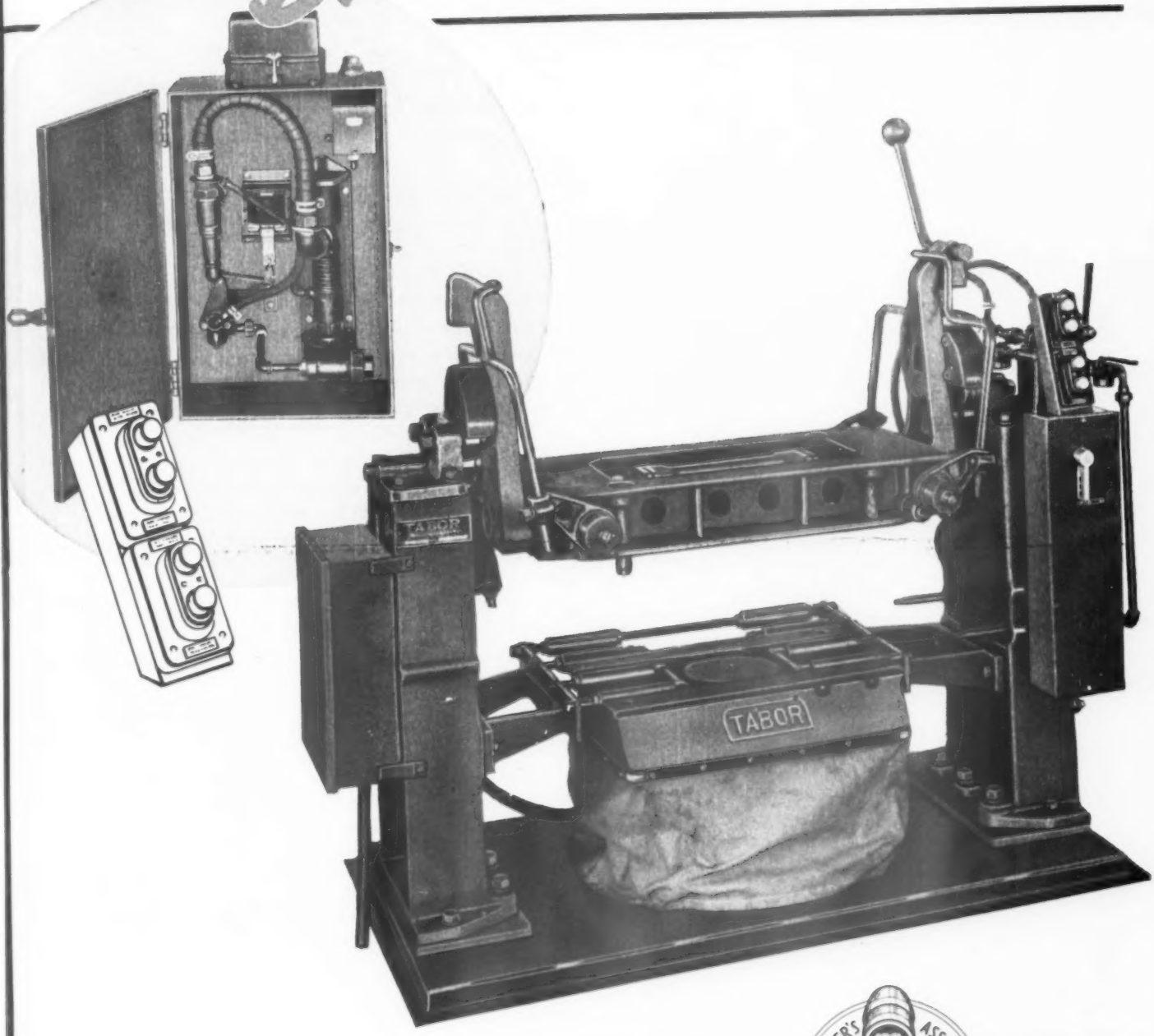
Snyder Foundry Supply Company, Los Angeles, California; Gallagher Foundry Supply Company, San Francisco & Oakland, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis 1, Mo.; E. R. Frost Co., Inc., Minneapolis 14, Minn.

The TABOR *Manufacturing Co.*

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

save labor . . .

...ine with the 'BRAINS' built in?"



...buy Tabor

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

Faster Melting... Better Control

WITH GENERAL BLOWER COMPANY'S

"LUNGS FOR INDUSTRY"

Cut your costs with efficient air or gas moving equipment. A precision flow of air or gas means an even flow of production.

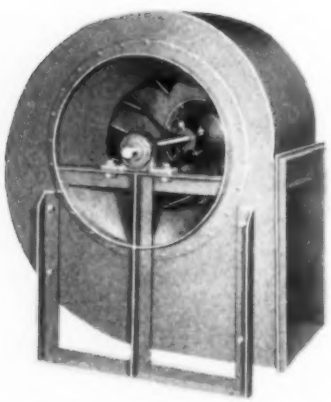
Our long experience in building and supplying Turbo and Rotary Positive types of Blowers, Exhausters and Gas Boosters enables us to supply you with the type of equipment best suited to your particular need, whether it is "standard" or "custom built", by giving you the maximum reliability in air supply.

The modern Foundry must hold shut downs to a minimum and eliminate high dust counts. General Turbo Blowers or Rotary Positive Blowers for Foundry Cupolas. General Multiblade Exhausters for Fume and Air Control.

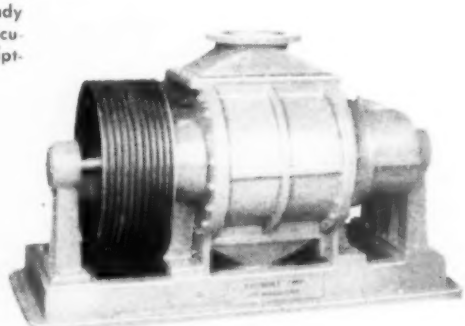
More than 20 years experience in designing and constructing "LUNGS FOR INDUSTRY" qualifies us to intelligently answer your problem.

Turbo Blowers

Our new, illustrated Product Bulletin "Lungs for Industry" is now ready for engineers and production executives. Your copy will be sent promptly on request.



Multiblade Exhausters



Rotary Positive Blowers

"LUNGS FOR INDUSTRY"

GENERAL BLOWER CO. PLANT AND GENERAL OFFICES 8603 Ferrise Ave., Morton Grove 3, Ill.

ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

Welding cast iron?

Here's a way...

to get good welds on the toughest jobs

SEEMS as though there's no end to the fine reports we get on Ni-Rod.

Welding shops are using Ni-Rod for jobs they'd never tackle before. *Foundries* are using Ni-Rod to repair defective castings quickly and easily. *Maintenance men* are using Ni-Rod for time- and money-saving repairs of broken and worn castings.

Ni-Rod is even being used on production lines.

Why does one electrode find such broad use?

Because Ni-Rod welds are strong welds... sound welds ...machinable welds.

And... because Ni-Rod is the easiest-handling electrode ever developed for welding cast iron.

If you haven't tried Ni-Rod, order a package today.. sizes are 1/8", 5/32" and 3/16". You'll find plenty of jobs for this electrode. Ni-Rod gives you a stable arc in all positions on either a.c. or d.c. Deposits are smooth, close to the color of cast iron and free from cracks and porosity.

Welders who use it, say, *"Ni-Rod is the easiest way to get the best welds in cast iron."*

Send for
Ni-Rod Instruction Booklet

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

NON-POROSITY was a "must" for this Ni-Rod repair job!

COMPANY
B. F. Goodrich Company, Akron, Ohio.

CASTING
One half of a steam-jacketed tire mold.

DEFECT
A thin section just above the steam and condensate ports.

PREPARATION OF THE WELD
The thin section was cut away until sound metal of at least ¼" wall thickness was found at all boundaries of the cut. A steel patch plate was then fitted into the opening. Edges of both plate and the surrounding cast iron were beveled to a vee of 75-90 degrees.

The entire half of the mold was preheated to 300° F.

WELDING
Using Ni-Rod, the inner and middle seams were welded and allowed to cool somewhat. Then, the outer seam was welded and lightly peened to counteract contraction stresses. Mold was allowed to cool slowly to room temperature.

TESTED
At 200 psi. water pressure.
At 100 psi. steam pressure.

COMMENTS
Several molds with similar casting defects have been repaired in this manner. No porosity has been detected. The welding has caused no appreciable distortion.

EMBLEM OF SERVICE
INCO NI-ROD TRADE MARK

NI-ROD IS DISTRIBUTED BY:

WHITEHEAD METAL PRODUCTS COMPANY, INC.
WILLIAMS and COMPANY, INC.
STEEL SALES CORPORATION
PACIFIC METALS COMPANY, LTD.
J. M. TULL METAL & SUPPLY CO.
METAL GOODS CORPORATION
EAGLE METALS COMPANY
HENDRIE & BOLTHOFF MFG. & SUPPLY CO.
ROBERT W. BARTRAM
ALLOY METAL SALES, LTD.
WILKINSON COMPANY, LTD.

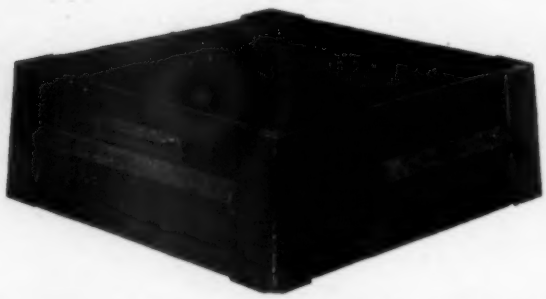
Order "Industrial" Get Prompt Delivery!

ON

STEEL FLASKS & SLIP JACKETS

FOUNDRY EQUIPMENT BUILT STRONGER TO LAST LONGER

● An all-welded steel flask designed for production and long life. Fabricated from quality materials to your specifications. Sand strips top and bottom with parting line surface ground for accurate fit.



● Accurate and durable heat resistant jackets built of steel to last through long production schedules.

● All sizes and modifications of above construction available. Let "Industrial" engineers help solve your problems of unique conditions, special shapes and sizes.

WRITE, WIRE, OR PHONE YOUR INQUIRIES TO YOUR DISTRICT SALES REPRESENTATIVES

SERVING—NEW ENGLAND—NEW YORK—NEW JERSEY—EASTERN PENNSYLVANIA

WILSON INDUSTRIES
38 MEMORIAL DRIVE
CAMBRIDGE 42, MASSACHUSETTS

SERVING—WISCONSIN

WM. J. PANKRATZ
233 SOUTH STREET
WAUKESHA, WISCONSIN

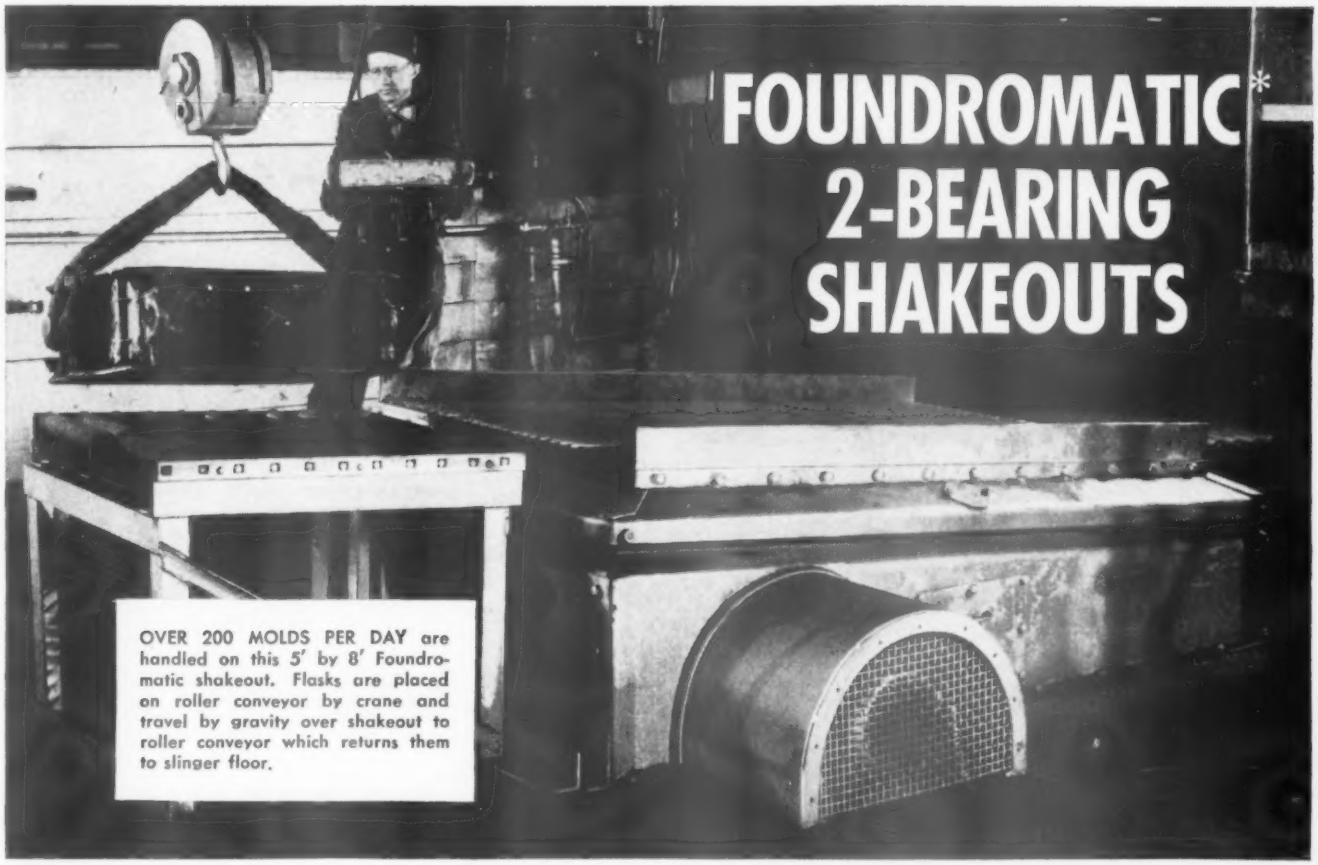
HOME OFFICE AND FACTORY

INDUSTRIAL FABRICATING, Inc.

TELEPHONE 6781

817 HALL STREET EATON RAPIDS, MICHIGAN

NOW... in Stock


FOUNDROMATIC* 2-BEARING SHAKEOUTS
OVER 200 MOLDS PER DAY are handled on this 5′ by 8′ Foundromatic shakeout. Flasks are placed on roller conveyor by crane and travel by gravity over shakeout to roller conveyor which returns them to slinger floor.

A NUMBER of Foundromatic 2-bearing shakeouts, complete with motors and drives are now available in the following sizes: 4′ by 6′ Capacity 4 tons—5′ by 8′ Capacity 7½ tons — 6′ by 8′ Capacity 18 tons — and 8′ by 10′ Capacity 25 tons. These rugged, heavy duty units increase production . . . reduce flask maintenance . . . improve foundry working conditions.

And you take no chances when you specify Allis-Chalmers . . . for all A-C foundry equipment was developed and tested in its *own* foundries . . . designed to do its job right, with a minimum of expense. Consult Allis-Chalmers now about mechanized equipment for *your* foundry. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

THESE 7 FOUNDROMATIC FEATURES GUARANTEE LONG, TROUBLE-FREE SERVICE

1. Body and shakeout deck are "all welded" . . . then stress relieved before machining for uniform strength.
2. Floating shakeout body is supported by resilient springs. No objectionable vibration can be transmitted to building.
3. Eccentric shaft produces effective vibratory motion. Castings and molds are freed in only a fraction of the time required with other methods.
4. Balance wheel and driven sheave are integrally constructed . . . no extra cost for sheave and flask breakage is minimized.
5. Entire weight of body and mold is carried by support springs. Bearings are required only to take care of centrifugal force of mechanism, resulting in longer bearing life.
6. Pivoted motor base maintains uniform V-belt tension . . . increases belt life.
7. No operating adjustments. Vibrating motion is positive and uniform up to maximum capacity. Large or small loads can be handled *without adjustment of any kind.*

SEND FOR NEW BULLETIN

07B6092A, "Foundry Mechanization"—for information on the entire Allis-Chalmers line of foundry equipment.

CUPOLA BLOWERS

All practical sizes. These units can be equipped with air weight control for better cupola economy. Request Bulletin 16B6048A.

COMPLETE A-C SCREEN LINE

includes *Low-Head, Aero-Vibe, Ripl-Flo* and *Utah* electric screens for every foundry screening job.

REGULEX* CONTROL

for arc furnaces makes possible lower cost melts by raising and lowering electrodes in response to changing furnace conditions.

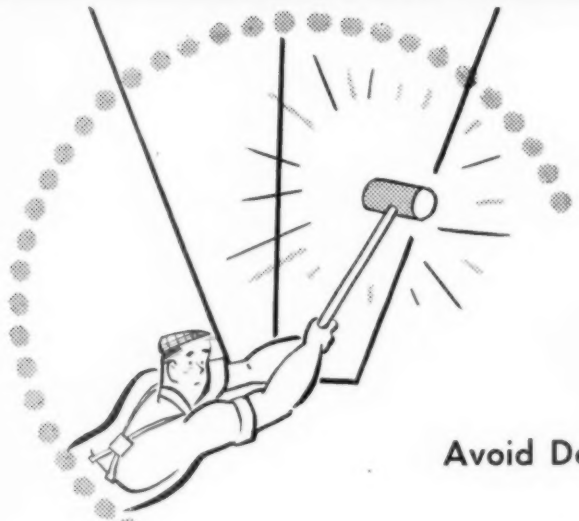
*Allis-Chalmers Trademark

A 2321

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great



SAVE *the* BINS

Avoid Destructive Pounding

Install

CLEVELAND Pneumatic VIBRATORS

. . . to 'step-up' production . . . . to eliminate 'arching-over' and 'plugging' . . . . and to assure a steady, continuous flow of sand from hoppers, bins and chutes . . . . engineered for continuous or intermittent service to deliver rapid, powerful, 'hammer-like' blows of greater intensity than can be expected from any other type of vibrator . . economical initial installation and operating cost . . . available from stock in horizontal and vertical mountings in a wide variety of sizes . . . . recommendation as to type and size required is promptly made on receipt of information as to size and capacity of your hoppers, bins or chutes.

CLEVELAND

CLEVELAND VIBRATOR COMPANY

★ 2828 Clinton Avenue Cleveland 13, Ohio ★

I'm *Doc Tillity*, one of Federated's friendly service men. Me and the other Federated service boys have worked with metals for quite a while now and . . . we know our stuff. What's more, we're ready to prove it to you any time you run into a metal problem, big or little.

Federated is a right large outfit— first in the whole non-ferrous field— and they're anxious to have us service men roll up our sleeves and help you out whenever you ask.

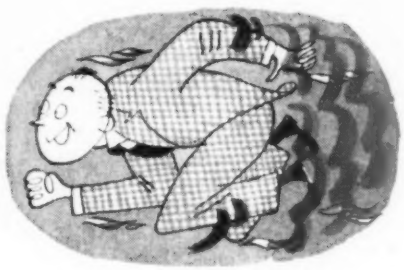
Remember, boys, for service . . . for anything in the non-ferrous metals line, call Federated first. Our offices are all over the country.

I'll be seeing you and talking to you again pretty soon. So long for now.

Sid was sick of shortages—so...

1. . . . he finally decided to convert to aluminum.

2. His competitor, Carl, just laughed. "Aluminum can't be adapted to Sid's product," Carl chortled.

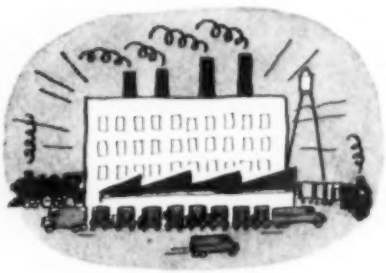


3. But Sid was off like a fireball! For he'd learned that alloys of Kaiser Aluminum could meet almost every type of operation. And it could be formed, drawn, spun, brazed or joined.

4. "So alright, he did it," shrugged Carl, "but the cost will break him."

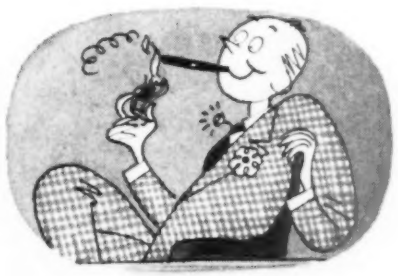
5. But foxy Sid found that though aluminum costs a little more to begin with, savings in handling, fabricating, finishing and shipping more than made up the difference.

6. Still, die-hard Carl wouldn't budge. No siree, he'd wait for the metal he had *always* used.



7. Meanwhile, Sid's product sold like popcorn at a circus. Folks preferred aluminum products. Result: Soaring production cut costs still further.

8. Now, would you rather be Carl?



9. . . . or Sid?

MORAL: Alert manufacturers—making everything from general appliances to residential buildings, from garage doors to heating and ventilating ducts—are speeding production, nailing down new markets . . . by converting to *Kaiser Aluminum*. The problems solved by them can help *you*. So call in a Permanente engineer *today!*

Ready to serve you—*today*...

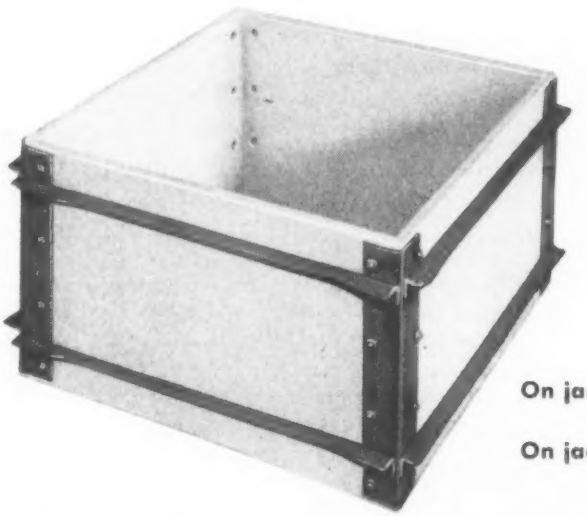
Kaiser Aluminum

a Permanente Metals product

DISTRIBUTED BY PERMANENTE PRODUCTS COMPANY, KAISER BLDG., OAKLAND, CALIFORNIA . . . WITH OFFICES IN: Seattle • Oakland • Los Angeles • Dallas • Wichita • Kansas City • St. Louis • Atlanta • Minneapolis • Milwaukee • Chicago Cincinnati • Cleveland • Detroit • Boston • Hartford • Buffalo • New York City • Philadelphia • Washington, D. C.

MOLTEN METAL *CAN'T* HURT 'EM!

NON-BURN NON-WARP SLIP JACKETS



ARE NOT AFFECTED BY RUNOUTS or SPILL-OVERS

CMD Slip Jackets won't stick; they fit smoothly and strip *clean* from the mold.

Heavy corner irons 2″ x 2″ x ⅛″ and cross reinforcing irons 1″ x 1″ x ⅛″, bolted and arc-welded in place prevent warping.

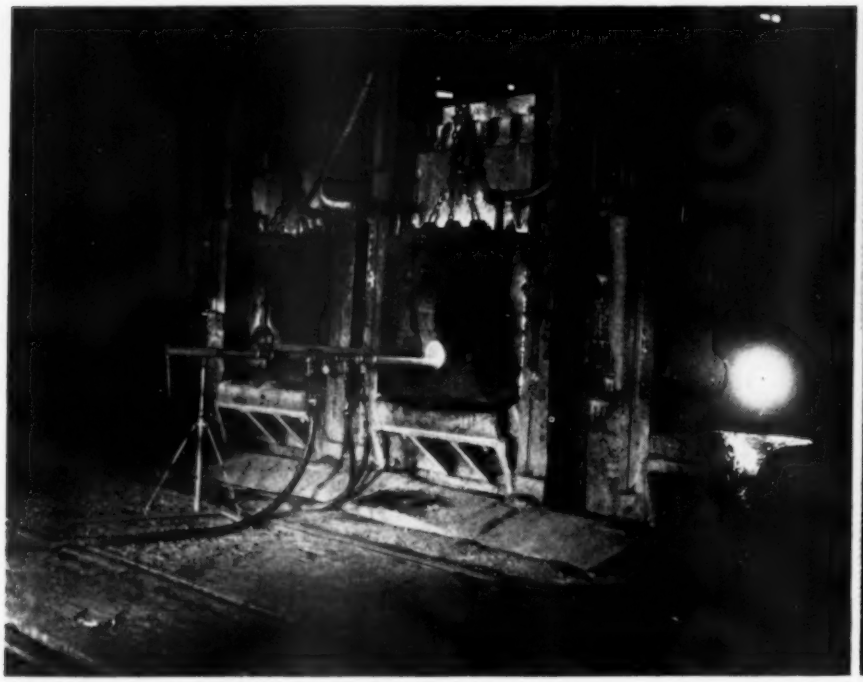
Write Today for Descriptive Circular!

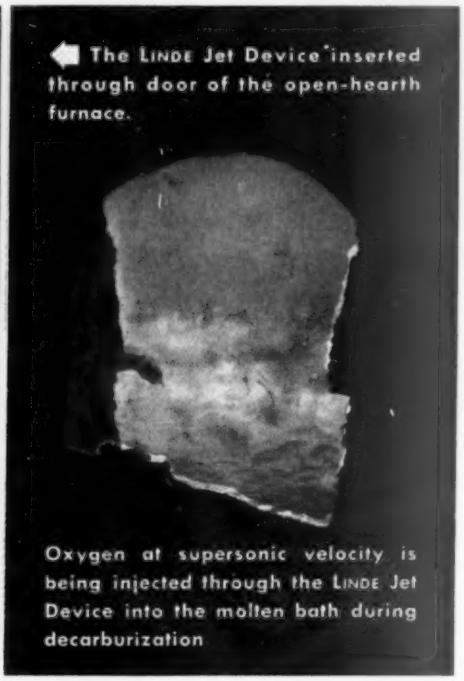
On jackets up to 8″ deep, SINGLE angle irons are used.
On jackets over 8″ deep, DOUBLE angle irons are used.

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. F, 1928 West 46th Street — Chicago 9, Illinois

What's the Story on Oxygen in Steel-Making Furnaces? No. 2 of a Series (No. 1 was a general review)





The LINDE Jet Device inserted through door of the open-hearth furnace.

Oxygen at supersonic velocity is being injected through the LINDE Jet Device into the molten bath during decarburization

OXYGEN

Speeds Decarburization

THE GREATEST AMOUNT OF EXPERIMENTAL WORK on use of oxygen in the steel-making furnace has been directed toward shortening the refining period. Data on oxygen* use in more than 6,500 heats in 34 mills with which LINDE has co-operated have been recorded. Among these data are records of tests in which oxygen of various purities, compressed air, and even nitrogen, were injected into the molten bath.

All these tests produced rates of decarburization better than are obtained through normal ore practice. The effectiveness was greater, however, the higher the oxygen purity. With high-purity oxygen, rates of carbon reduction were increased two to four times over normal rates. Both the lance and Jet Device were used to introduce the oxygen.

Before final acceptance is assured, the equipment for injecting oxygen must be mechanized. The LINDE Jet Device, a water-cooled non-consumable tool, seems at present to offer the best opportunity for mechanization that will eliminate interference with charging procedures.

Much more extensive experience in individual shops must be gained before the optimum oxygen purity for use in each phase of steel-making can be determined.

*Supplied mostly as DRIOX high-purity liquid oxygen. Economics of low-purity gaseous oxygen will depend on purity, quantity, pressure required; size of storage facilities; and other demand characteristics.

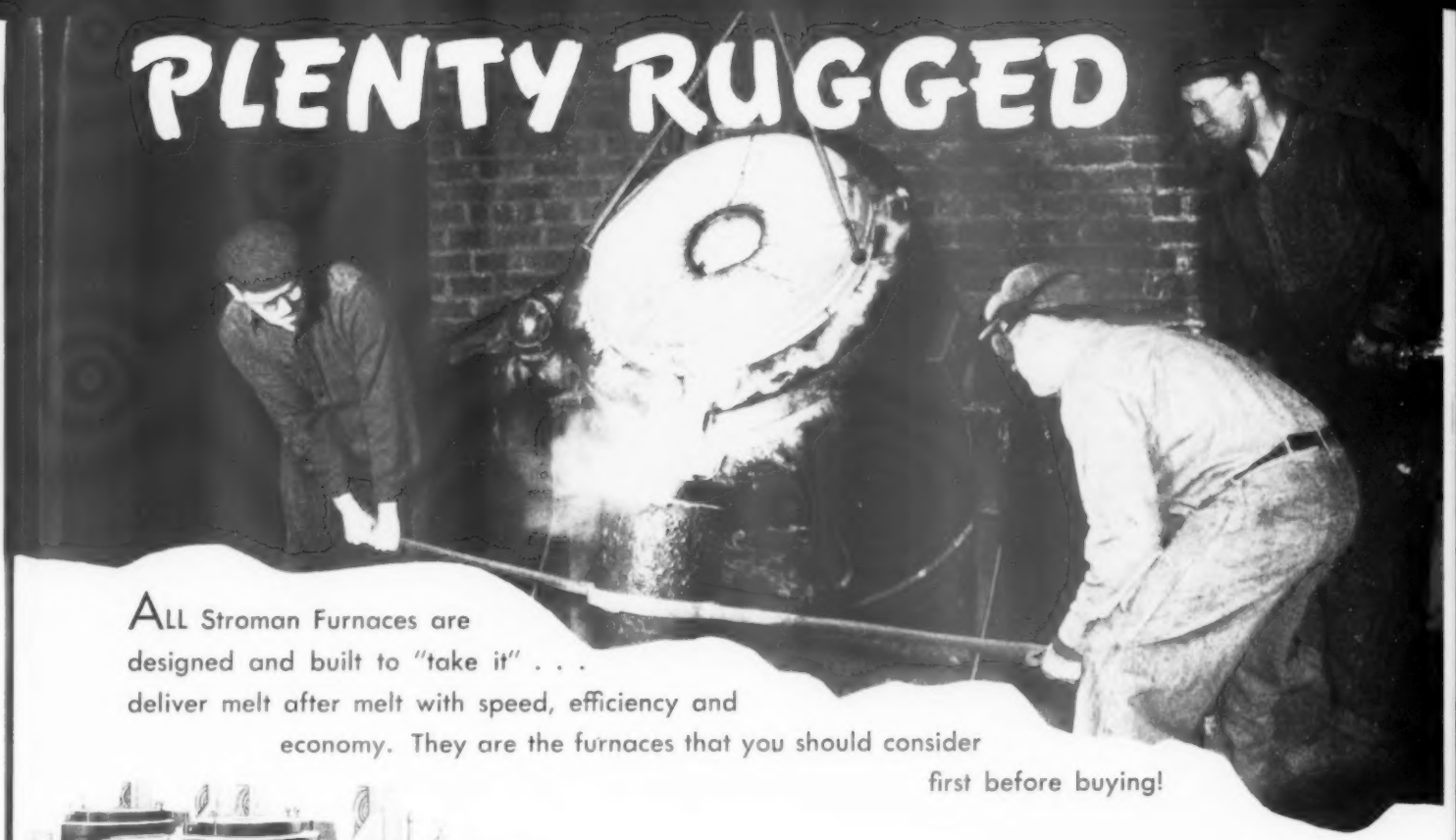
Management and production executives are invited to write for the factual report which LINDE *has prepared on oxygen use in steel-making furnaces. Please address Room 308, 30 E. 42nd St., New York 17, N. Y.*

Linde
Trade-Mark

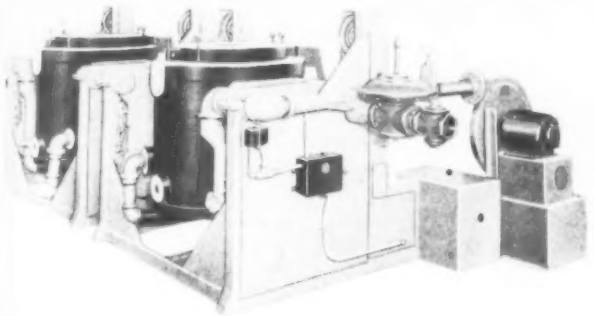
THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The words "Linde" and "Driox" are registered trade-marks of The Linde Air Products Company.

PLENTY RUGGED



ALL Stroman Furnaces are designed and built to "take it" . . . deliver melt after melt with speed, efficiency and economy. They are the furnaces that you should consider first before buying!



STROMAN MECHANICAL TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze, Aluminum and other Non-Ferrous Metals
Capacity from 125 to No. 400 Crucible

Featuring the famous Stationary Lip Pour. Excellent for Foundry, Permanent Mold or Die Casting Plants. Sturdiest Construction . . . and lowest fuel cost with either oil or gas fire.

STROMAN MANUAL TILT CRUCIBLE MELTING FURNACES

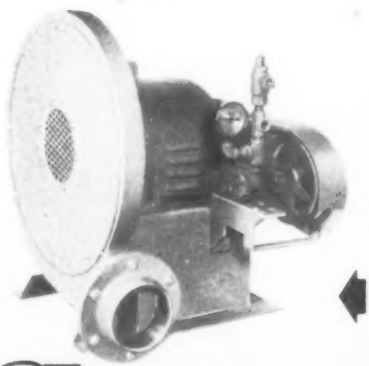
For Brass, Bronze, Aluminum

Designed for utmost production and longest crucible life. Is so easy to operate and very economical. Oil or Gas Fire. Capacities from No. 30 to No. 500 Crucible.

STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other Non-Ferrous Metals

Sturdy, efficient and featuring the Stroman Push-back Cover. These furnaces will handle a maximum of production in minimum time. Oil or Gas Fire. Capacities — No. 20 to 400 Crucible.



STROMAN COMBINATION BLOWER AND OIL PUMP UNITS

Deliver air as well as fuel oil to burners. Blower and oil pump are operated by one motor. Complies with all safety codes. Stroman also makes all types of centrifugal Blowers for Industrial Use. Send for Bulletin No. 300 for information.

STROMAN IRON POT STATIONARY MELTING FURNACES

These furnaces are highly recommended as break down furnaces for Zinc and Aluminum Die Casting Plants. They can be supplied with or without hoods. Construction assures longest pot life and lowest fuel costs. Oil or gas fire. Capacities from 212 to 14,000 lbs. Zinc. Other metals in proportion.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO

Thanksgiving feast for your cost department

Would you like to invite your cost department to a feast of extra profits every day?

Maybe a careful look into your grinding operations will lead to reduced production expenses . . . savings that would make your cost men give thanks over and over again for the many dollars saved.

You'll be missing a good thing if you fail to consider this proposal: Let Peninsular Engineers give your grinding a complete study.

They will investigate your grinding from every angle—your equipment, the materials you grind and all other factors that influence grinding costs. From results learned, they will offer you a job-designed grinding program that may mean appreciable savings for you.

Since 1889, Peninsular Engineers have specialized in solving grinding problems. We believe they can render a valuable service for your grinding, too.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

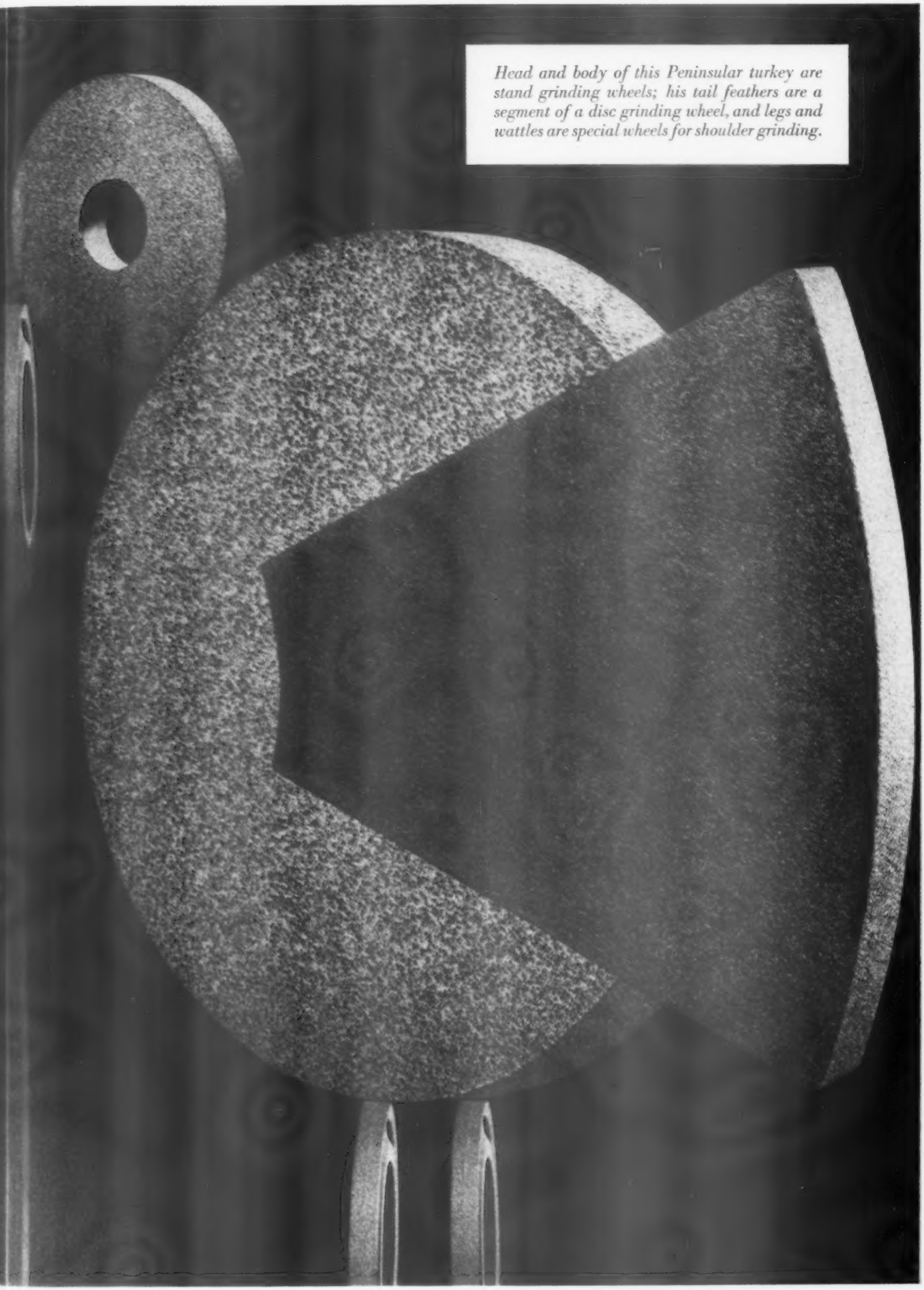
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

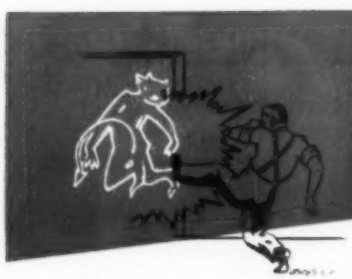
GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID & VITRIFIED BONDED WHEELS

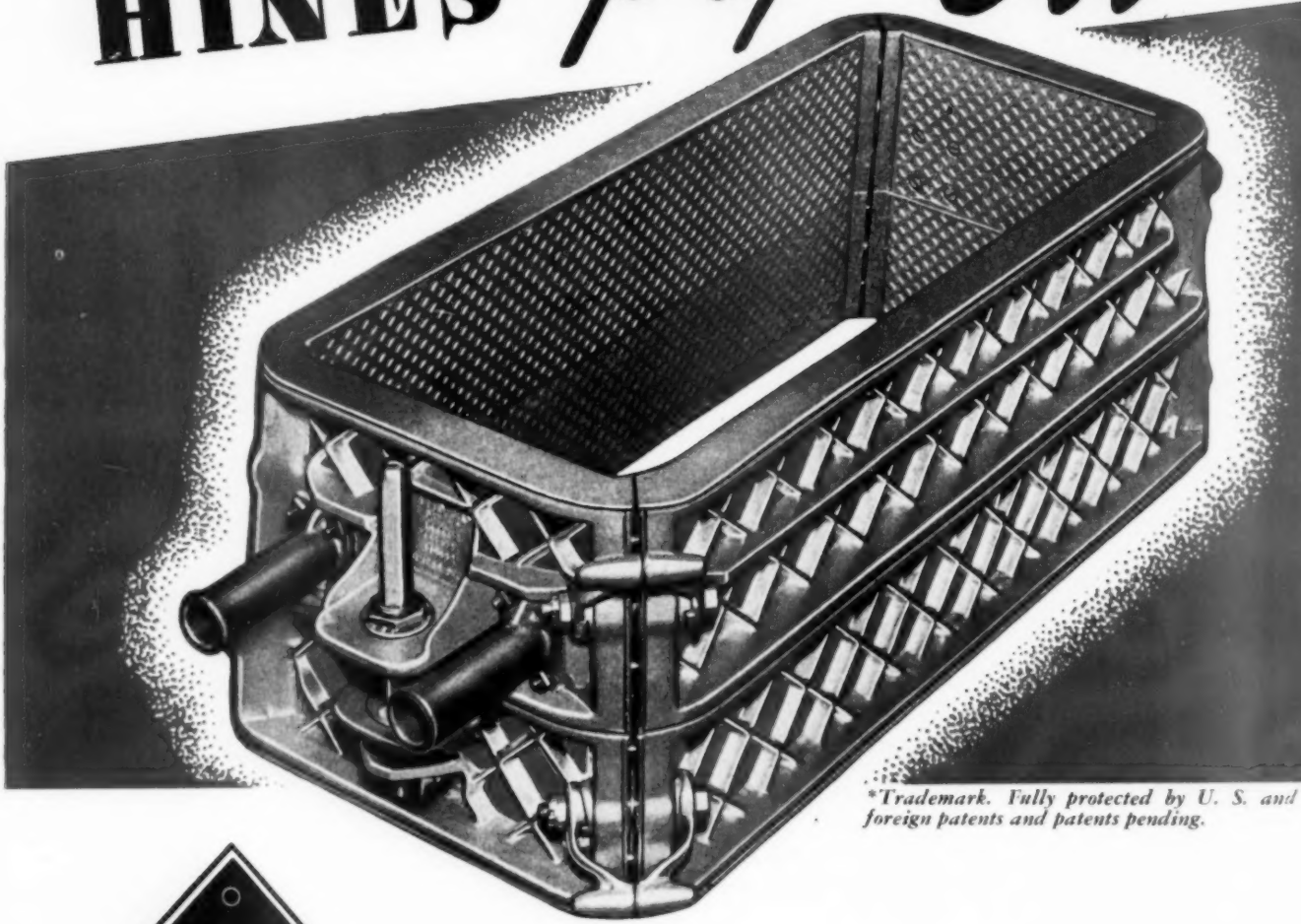


Head and body of this Peninsular turkey are stand grinding wheels; his tail feathers are a segment of a disc grinding wheel, and legs and wattles are special wheels for shoulder grinding.



Banish trouble with a POP-OFF*

HINES "Pop-Off"*



*Trademark. Fully protected by U. S. and foreign patents and patents pending.

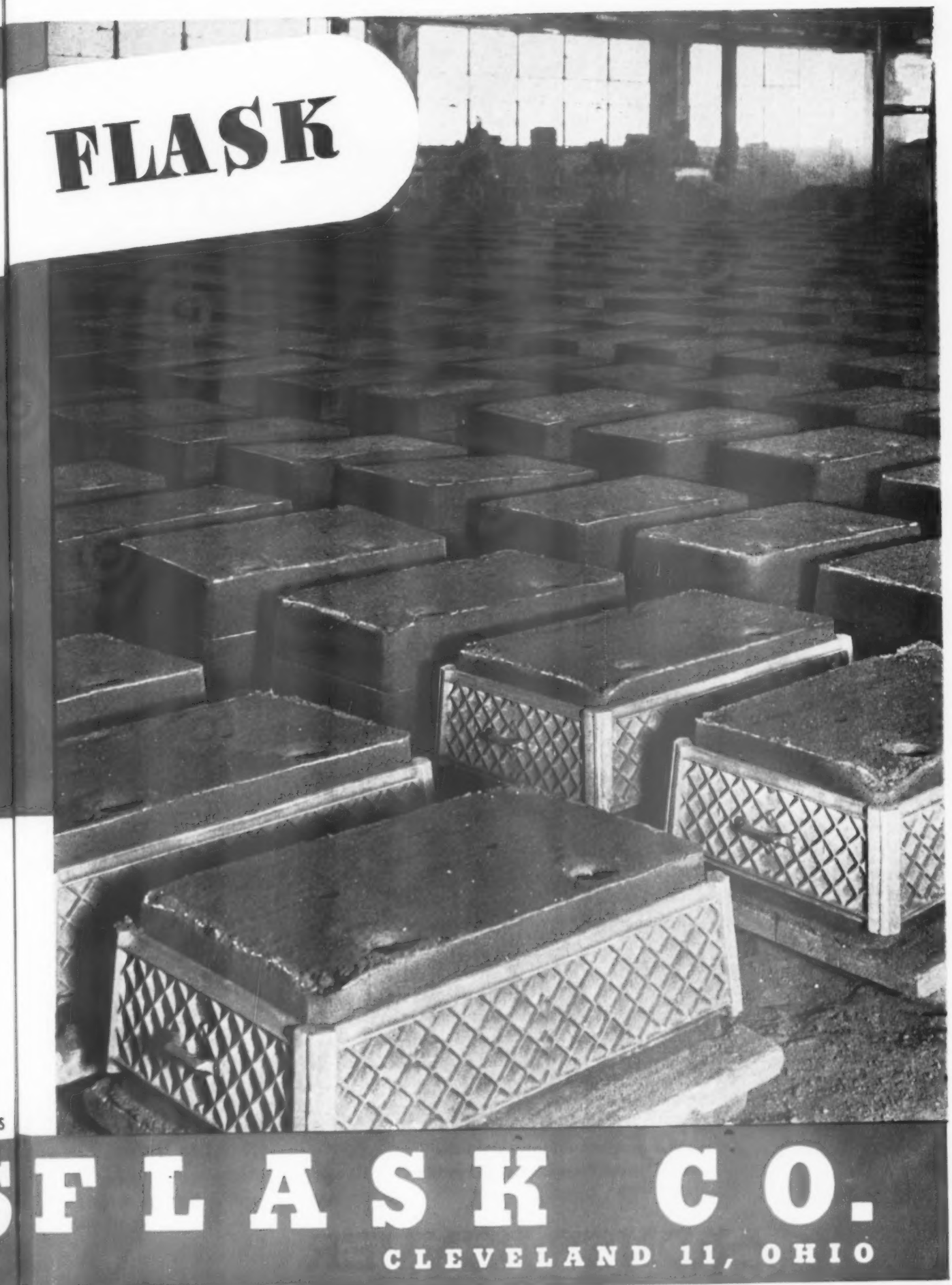
HINES
POP-OFF
(Trademark Reg. U. S. Pat. Off.)
FLASK

Here is another Hines "Pop-Off" Flask at work boosting production and lowering costs. Thousands more are repeating this performance all over the world.

EXCLUSIVE MANUFACTURERS OF "POP-OFF" FLASKS AND JACKETS

THE HINES

3431 WEST 140th ST.



S FLASK CO.

CLEVELAND 11, OHIO

SAVES SPACE ...SAVES COSTS in your foundry

Gardner-Denver Class AA Vertical Water-cooled Single Stage Compressor, direct connected to motor. These duplex compressors are furnished in capacities from 64 to 184 cubic feet displacement per minute.

You'll like the way a Gardner-Denver Class AA Compressor saves space in your plant. For these motor-driven compressors are especially designed for direct connection to electric motors and are mounted on a common sub-base with the motor.

And you'll like the way Class AA Compressors save costs. The transmission of power direct to the compressor crankshaft results in higher efficiency and reduced power consumption. You don't pay for belt and belt friction losses.

These AA Compressors are *quality* machines in every sense of the word. Here are some of their many outstanding features:

* *Unusually large size water jackets around cylinders provide efficient cooling.*

* *Positive, automatic lubrication.*

* *All parts that require adjustment easily accessible.*

* *Durable plate type valves.*

(With Gardner-Denver AA Compressors, use a Gardner-Denver Air Receiver to equalize the discharge pulsation from the compressor and to permit a steady flow of air to the work.)

For complete information, write
Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER
SINCE 1859

Get more tonnage for your snagging wheel dollar

Simonds Abrasive resinoid bonded wheels with patented Red Streak Flanges speed up production on all types of floor stand and swing frame grinders. Easier mounting (steel against steel), less wear on mount centers, no chipped sides and edges at center hole, plus better balance for truer, better grinding action result in greater tonnage, lower cost.

Ask any Simonds Abrasive Distributor for more details on resinoid bonded Red Streak Flange Wheels or send for our Snagging Wheel Bulletin.

SIMONDS ABRASIVE COMPANY
is a division of
SIMONDS SAW AND STEEL CO.
Fitchburg, Mass.
Saws, Machine Knives, Files

Other Divisions
SIMONDS STEEL MILLS
Lockport, N. Y.
Special Steels

SIMONDS CANADA SAW CO. LTD.
Montreal, Can.
Simonds Products for Canada

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

Cleco Rammers

CARRY THEIR WEIGHT... JUST GUIDE 'EM TO THE WORK!

Chippers, grinders, core breakers and air line accessories are also included in the Cleco line for the foundry.

Want fast, easy-holding rammers for either floor, flask, bench or core work? You will find exactly the right model for your job in the complete Cleco line.

In addition to being great labor savers, Cleco Rammers improve casting quality by insuring uniform mold density. All models feature end pressure-seating valves that actually improve with use. The smaller models have effective poppet type throttles, while the floor models have snap throttles—both types are trouble-and-leak-proof. Large oil chambers insure efficient lubrication at all times. *Write for Bulletin 76B.*

SPECIFICATIONS

	No. 0B	No. 1	No. 4B	No. 1F	No. 4	No. 5
Length (including Butt)	17"	20½"	24"	43"	48"	49"
Weight (including Butt)	5¾ lbs.	12¼ lbs.	23½ lbs.	16 lbs.	22 lbs.	33¾ lbs.
Bore and Stroke	1" x 2"	1" x 4"	1¼" x 5"	1" x 4"	1¼" x 5"	1½" x 6"
Speed in Strokes per Minute	2500	950	950	950	950	750

Cleco DIVISION of THE REED ROLLER BIT COMPANY
P. O. BOX 2119 . . . HOUSTON 1, TEXAS

NOW! YOUR HEAT-TREATING PROBLEM HAS A "PACKAGED" ANSWER..

● **You've only begun to solve** your heat-treating problem when you buy the furnace! To do the complete job, necessary accessories—atmospheres, conveyors, controls, handling equipment—must be specified and ordered. But why buy piecemeal from several suppliers when you can get a *complete "packaged process" from one source*—General Electric.

In addition to standard and special electric furnaces for almost every heat-treating application, G.E. is prepared to supply a complete, "production-line," heat-treating process from start to finish—the entire job completely engineered, co-ordinated, and installation supervised by *one* organization. This means that you get all the benefits of concentrated responsibility in a Company that has more than 40 years of experience in heat-treating engineering and industrial heating manufacturing.

"PACKAGED PROCESSES"
Provide
COMPLETE SERVICE

- **Engineering**
- **Manufacturing**
- **Supervision of Installation**

So the next time you need industrial heating equipment, call in the Heating Specialist in the nearest G-E Office. He can take much of the load off your shoulders. His wide experience makes him well qualified to survey your requirements and to recommend the most suitable electric heating equipment—electronic induction heaters and small heating devices, as well as furnaces. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

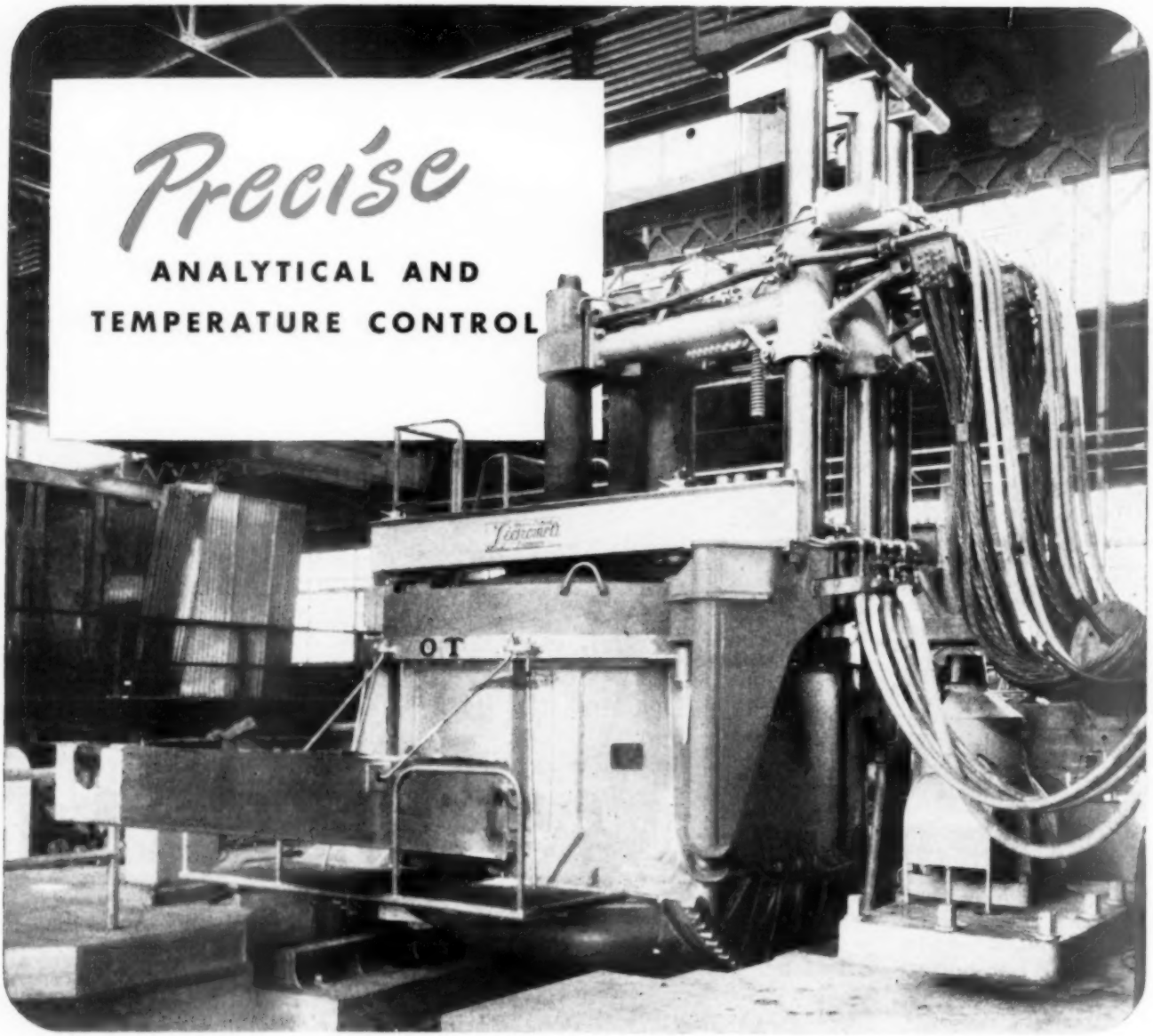
WE PRACTICE WHAT WE PREACH

The new General Electric plant for the manufacture of fractional-horsepower motors at Tiffin, Ohio (a part of which is shown above) is an excellent example of a "packaged" installation. The precision-control electric heat-treating equipment includes 7 roller-hearth furnaces, four smaller mesh-belt conveyor furnaces, protective-atmosphere equipment, control panels for all the furnaces, incoming-line switchgear, unit substations, high- and low-voltage cable—the entire installation engineered and manufactured by General Electric.

• ATMOSPHERE PRODUCERS • ASSOCIATED ELECTRIC EQUIPMENT • ACCESSORIES
• UNIT-ENGINEERED FURNACES • QUENCHING AND HANDLING APPARATUS

GENERAL ELECTRIC

675-165



FOR THE MELTING AND REFINING OF **QUALITY** STEELS AND IRONS...

★ Precision control means money to you—money saved by the elimination of much of the ordinary production waste and spoilage—money gained by the manufacture of a superior product. And when it comes to the melting and refining of iron and steel, the best in precision control is Lectromelt.

Lectromelt furnaces, with their patented counter-balanced electrode arm control, their time and labor saving top-charge feature, their versatility, flexibility and all-around excellence of performance, are the top equipment in the field. Their daily use by thousands of metal melters testifies their superiority.

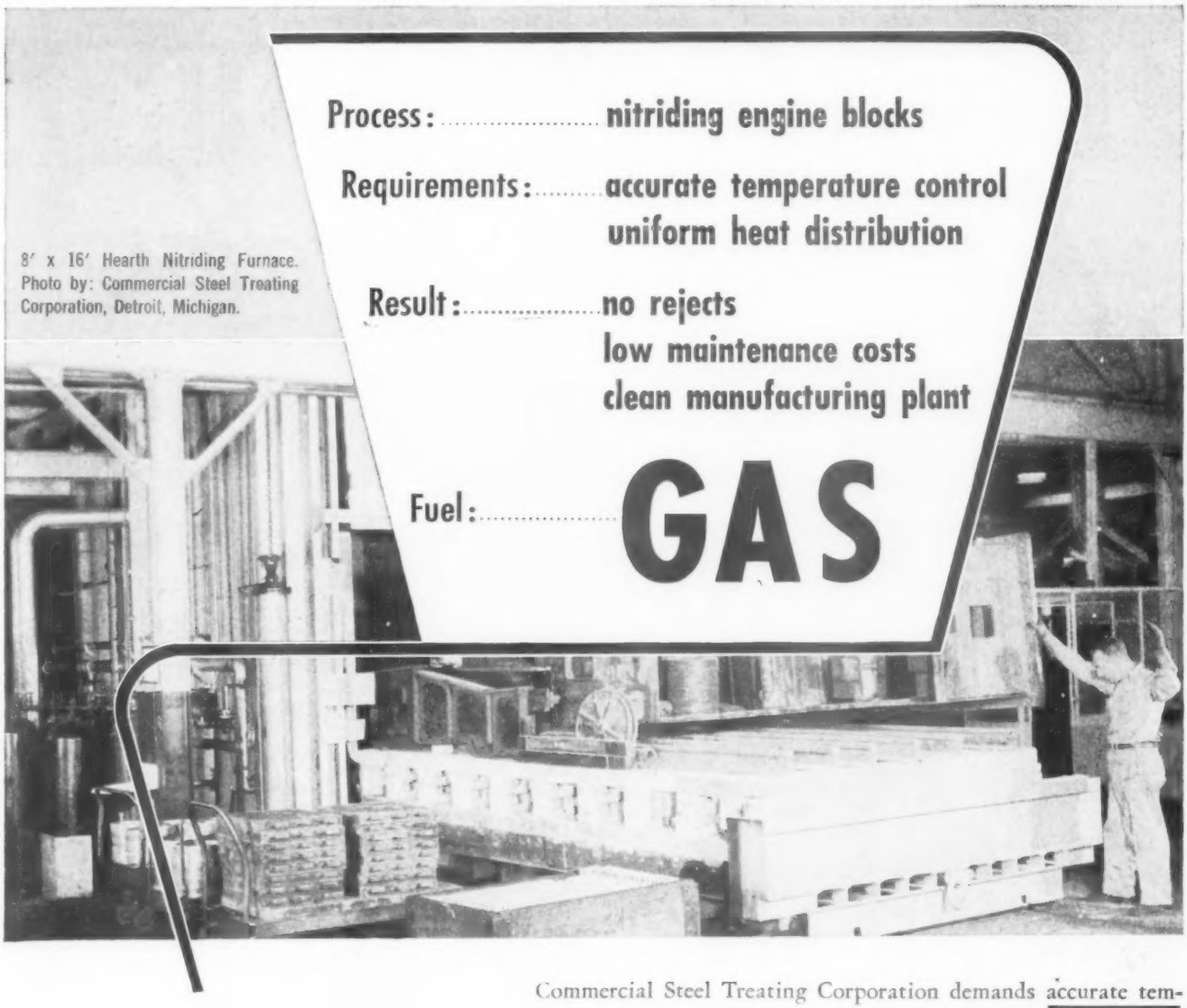
For complete details about Lectromelt furnaces as applied to your needs, write today.

MOORE RAPID *Lectromelt* FURNACES

Manufactured in:

England	Birlec, Ltd., Birmingham
France	Stein et Roubaix, Paris
Spain	General Electrica Espanola, Bilboa
Belgium	S. A. Belge Stein et Roubaix, Bressoux-Liege

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH 30, PA.



8′ x 16′ Hearth Nitriding Furnace. Photo by: Commercial Steel Treating Corporation, Detroit, Michigan.

Process: ..... **nitriding engine blocks**

Requirements: ..... **accurate temperature control**
uniform heat distribution

Result: ..... **no rejects**
low maintenance costs
clean manufacturing plant

Fuel: ..... **GAS**

Capacity and product specifications for the GAS-fired furnace include:

- **Temperature** ..... **975 degrees F.**
- **Allowable Variation** ..... **±5 degrees F.**
- **Process Time** ..... **96 hours**
- **Case Depth** ..... **0.025 inches**
- **Atmosphere Supply** ..... **Ammonia**
- **Production Rate** ..... **200 Tons per Month**

Commercial Steel Treating Corporation demands accurate temperature control and uniform heat throughout the chamber of its heavy-duty nitriding furnace. GAS fulfills these requirements; five years of successful operation supply the proof.

GAS, dependable fuel for industrial processing operations, meets the most exacting control and heating requirements. Low maintenance costs and cleanliness characterize GAS-fired installations.

You will want to study facts and figures on the use of GAS in your construction or modernization planning. The Industrial Representative of your local Gas Company has a wealth of useful information. He's as near as your telephone; he knows the answers.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

"IRONTON NOJOINT" for Foundry Ladles

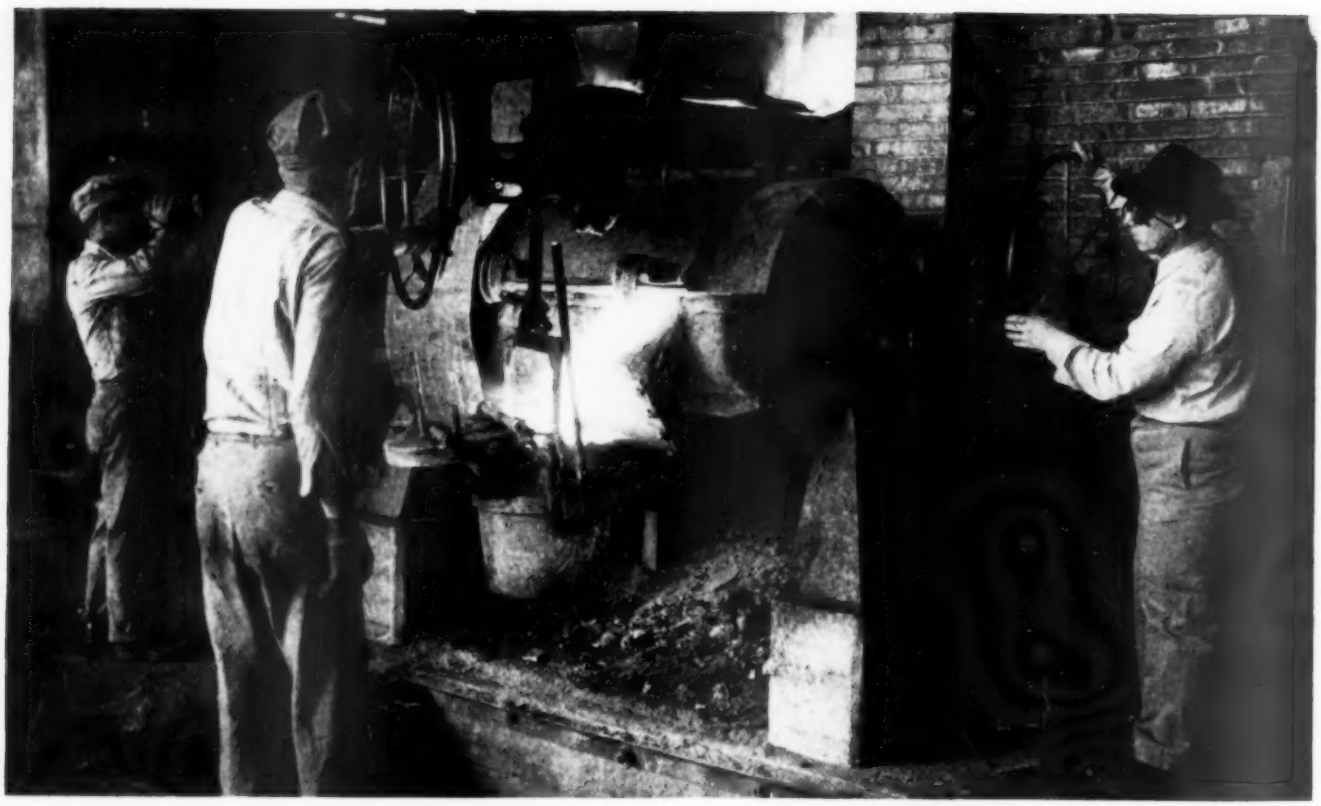


Photo Courtesy—McNally Pittsburg Foundries, Inc.

"Ironton Nojoint" gives much longer service than regular fire brick or special shapes when used as a rammed lining in cylindrical mixing, receiving or desulphurizing ladles, especially when "Purite" is used. The solid, dense, monolithic lining is free of joints and cracks and is very resistant to molten iron and alkaline slags.

"Ironton Nojoint" is packed in 550 lb. steel drums to prevent drying out in storage, and it will remain moist and workable indefinitely. It is economical to use, and may be quickly and easily installed.

We offer you the assistance of an experienced engineer in installing your original lining and training your men to do the job.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

HOW TO GIVE YOUR AIR POWER A SHOT IN THE ARM

THE new Rotor Needle Type Tester detects these culprits that choke off air pressure before it reaches your tools:

Loss due to inadequate size of pipe and hose.

Loss due to restrictions such as dirty strainers and hose menders.

Loss due to leaking couplings.

It's easy to use this Rotor Tester. Simply bend the hose at the tool and stick in the needle. The gauge indicates pounds of pressure at that point *while the tool is under full load.* If it's below par (80-90 pounds), track down the cause or call in the Rotor Application Engineer for advice.

Ask for details about this new Rotor Tester today!

AIR O'TOOL

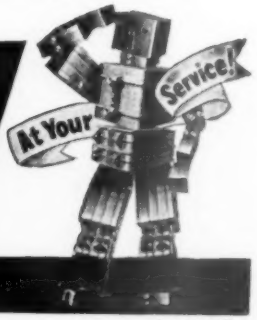
for a *Doubting* Thomas

Today's Sterling "LT" Flask built of special rolled channel steel . . . bent in one piece and welded at joint to form one solid, rigid piece. Steel trunnions are welded at ends or on sides, as desired. Handles do not interfere with rolling over sections while suspended on sling.

Sterling OFFERS VISUAL PROOF

Note the old, riveted Sterling Flasks in the above foundry scene. Unbelievable as it may seem, every Sterling shown here is a veteran of more than 15 years of hard, every-day service and each flask still has many years of service ahead . . . *visual proof* that Sterlings are soundly engineered and built for a long life of rugged foundry service.

Sterling FOUNDRY FLASKS



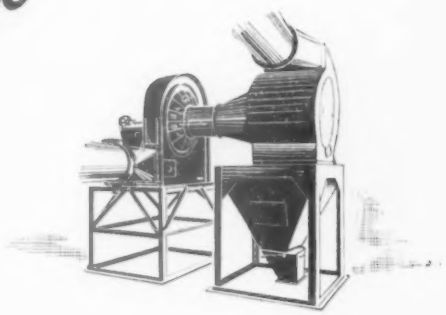
STERLING WHEELBARROW COMPANY • Milwaukee 14, Wis., U.S.A.

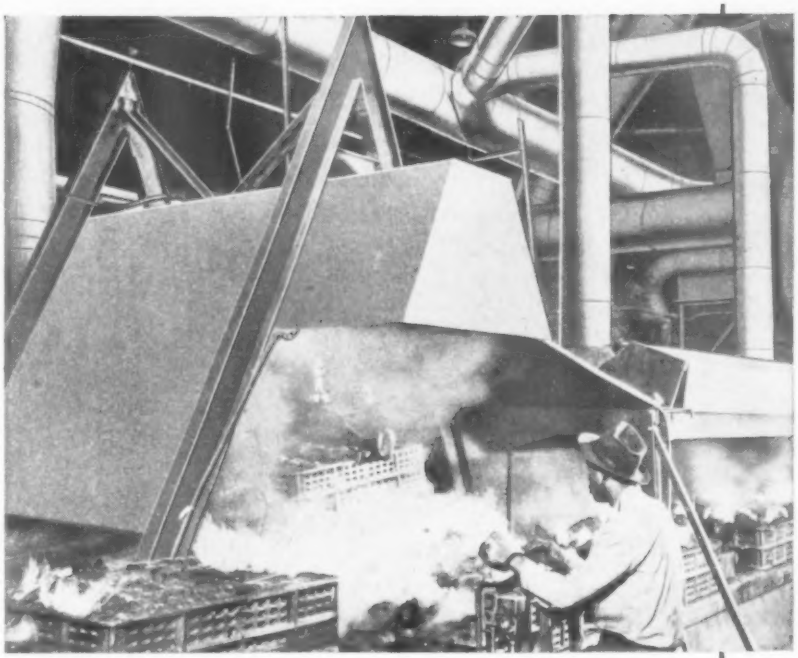
A 5251-1P

The more they Mechanize
The more they Modernize

WITH

ROTO-CLONE





ONE man at the levers controls the complete cope shakeout operation in this large automotive production foundry. But with the solution of one problem another was created. Mechanization meant a greater concentration of dust at the point of shakeout. What method of dust control could best handle this increased volume without interference to the mechanical handling system?

Use of overhead type hood and a Type W Roto-Clone with Precleaner proved the solution. A greater dust load was removed efficiently and the reduced air requirements of the overhead hood resulted in lower equipment cost.

The Type W Roto-Clone is a wet type collector, discharging the collected material as a slurry or sludge. It is designed to handle heavy concentrations of fine abrasive dust containing moisture or steam. Where heavy dust loads are encountered, the Type W Roto-Clone is supplied with Precleaner which removes the bulk of the dust before the final fraction is precipitated by the Roto-Clone.

When mechanizing shakeout or sand conditioning operations, plan to include Roto-Clone dust control. There's a Type W Roto-Clone of a size and arrangement to fit your specific layout. Write for Bulletin 270-A and name of nearest AAF representative.

AMERICAN AIR FILTER COMPANY, INC.
266 Central Avenue, Louisville 8, Ky.
In Canada: Dunbar-ling Bros., Ltd., Montreal, P. Q.

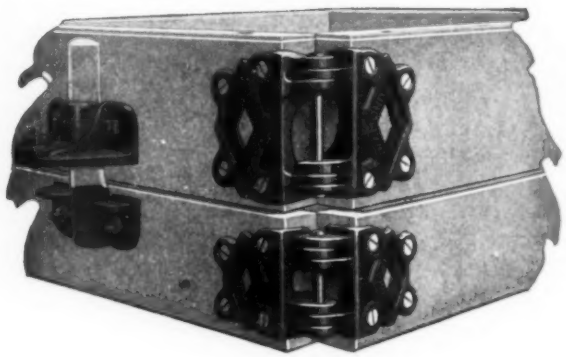
AAF

ROTO-CLONE
DUST CONTROL EQUIPMENT

ALL OUT FOR DIAMOND FLASKS

Another foundry modernizes to speed production and reduce costs with Diamond Flask Molding Equipment.

Diamond flasks are noted for their superior fittings. For instance, the latch fitting is self-compensating for wear. The tighter you draw it, the firmer the grip. Special cam is easily adjusted as extreme wear develops. Hinge construction includes careful milling of parts and interlocking feature which eliminates "play." In every way, you will find Diamond flasks precision-made for high production.



Our Flask Line is complete, of course, including all *special shapes* and a related line of *steel jackets.*

Originators of SNAP FLASKS

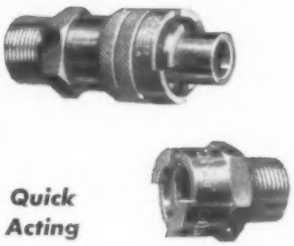
DIAMOND

Telephone 2553 **CLAMP AND FLASK COMPANY** Richmond, Indiana

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

"Dalbo" AIRLINE COUPLINGS and FITTINGS

PIPE ENDS

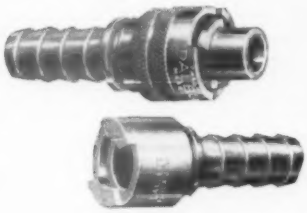


Quick Acting

Machined from solid bar steel and brass; steel is thoroughly rust proofed. Quick-lock sleeve. Male threads in six sizes: from ¼" to 1¼".

HOSE ENDS

Quick locking sleeves prevent accidental uncoupling. Grooved with four serrations on shank for standard hose clamps. Made in six sizes.



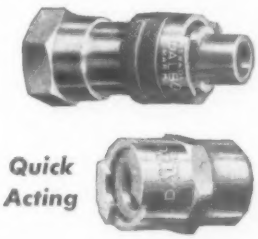
Quick Acting

SWIVEL NIPPLES

New Airhose Accessory

Straight and angle type nipples for horizontal or vertical working operations. Permits quick changing of tools. Eliminates hose kink. Increases efficiency.

PIPE ENDS

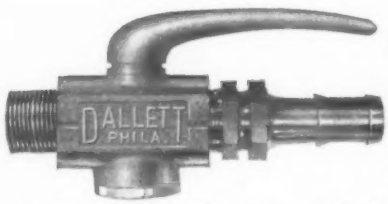


Quick Acting

Quick-lock sleeve, will not accidentally uncouple. Requires a quarter-turn to lock or unlock. Female threads made in six sizes: from ¼" to 1¼".

Write for Bulletin 300

AIR VALVES



Made for Hose Size ½" and ¾"

Pressure seated air valve with male thread at one end, grooved hose shank at other. Provides a convenient shut-off valve within operator's reach.

AIR VALVES

Angle permits hose line to fall away from valve and eliminates kinking. Valve has only three parts. Trouble-free construction assures long life.

30° Angle—made in 4 sizes

BLOW GUNS

All of Dallett's Blow Guns are made from brass. The lever valve style is made in two sizes: ¼" and ⅜". Extensively used wherever air is employed.

Lever Style

BLOW GUNS

Button Style

Dallett's shrouded button valve design Blow Gun eliminates possibilities of breaking or bending valve stem. Made from brass in ¼" and ⅜" sizes.

Write for Bulletin 300

TOOL MAKERS
PNEUMATIC
DALLETT
EQUIPMENT
ACCESSORIES
SINCE 1883

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.

Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

A BUYING GUIDE FOR ABRASIVES

POINT No. 10

REPUTATION

As many purchasing agents realize, known names carry plenty of weight in winning acceptance and approval of the men who use the products they buy. In abrasives, no name is more favorably known than that of The Carborundum Company. Instantly recognized and widely respected, it has signified peak quality for years.

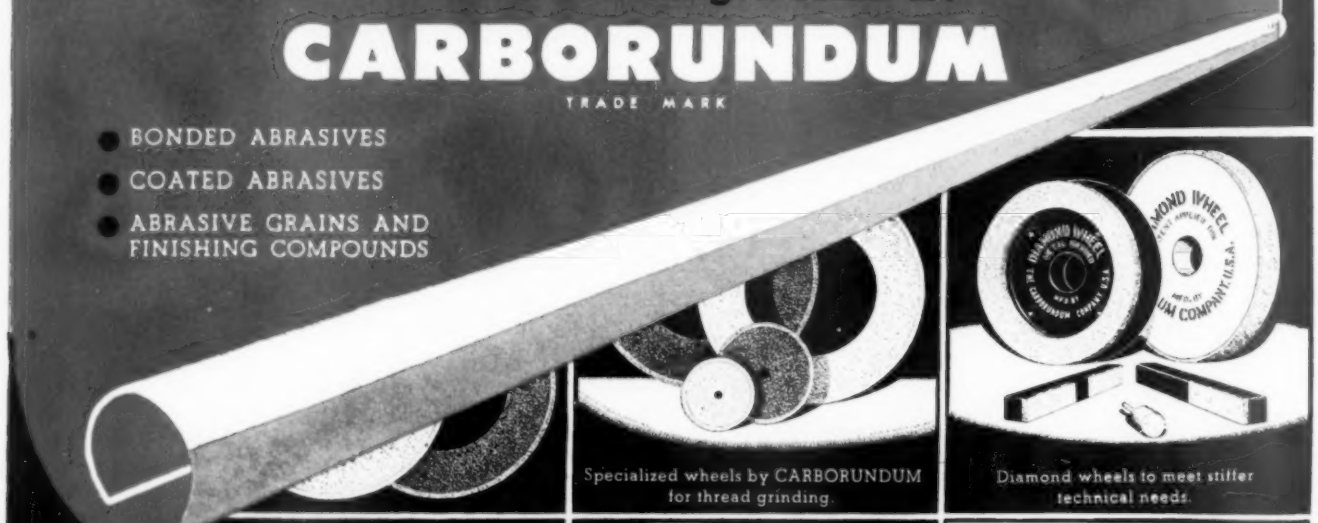
Management knows well the standing of The Carborundum Company in industry. Men who have worked with these abrasive tools are familiar with their superior performance. When abrasives by CARBORUNDUM are specified and ordered, there is no need to defend, explain or justify your selection. They are the choice of those whose preference has been confirmed by experience. The Carborundum Company, Niagara Falls, N. Y.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM

TRADE MARK

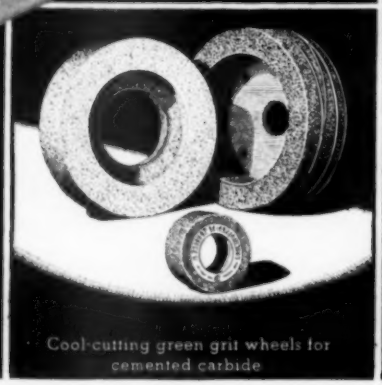
- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS



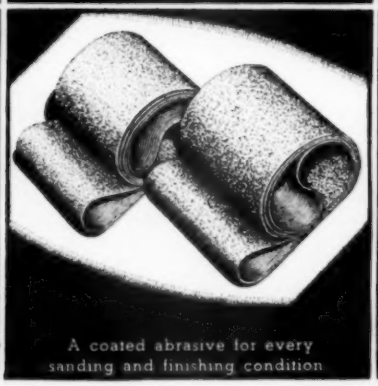
Specialized wheels by CARBORUNDUM for thread grinding.

Diamond wheels to meet stiffer technical needs.

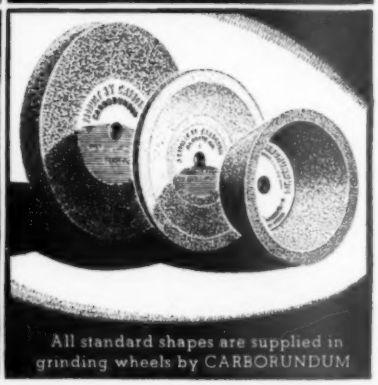
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.



Cool-cutting green grit wheels for cemented carbide

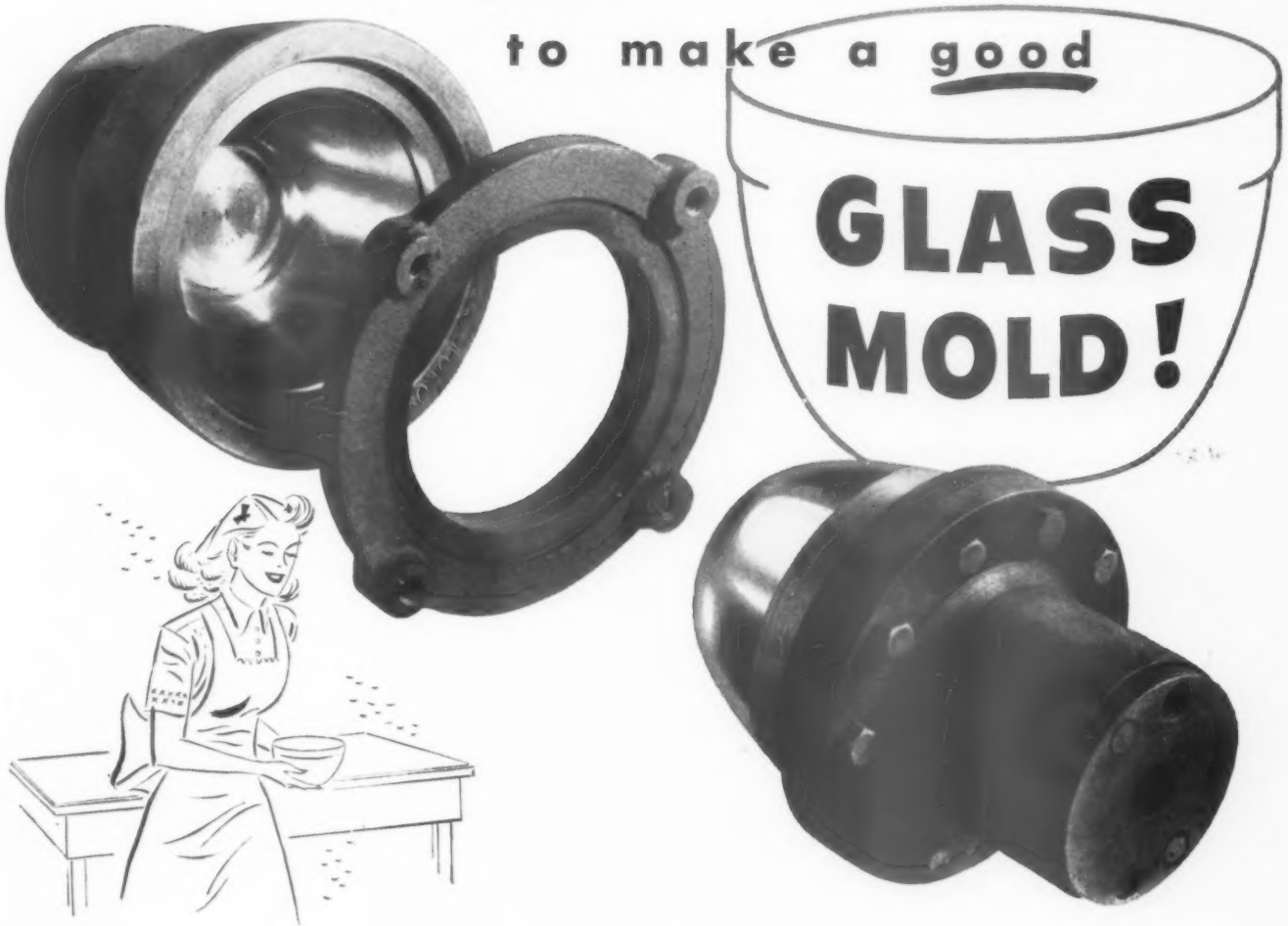


A coated abrasive for every sanding and finishing condition



All standard shapes are supplied in grinding wheels by CARBORUNDUM

It takes good PIG IRON to make a good GLASS MOLD!



This glass mold for mixing bowls—used by one of the nation's largest producers of heat-resistant glass products—is made of Republic CHATEAUGAY Pig Iron. Why? Because CHATEAUGAY is the *one* iron which can be depended upon *every time* to provide smooth, flawless machined surfaces.

Here is a story of vital importance to every casting producer. It's the story of CHATEAUGAY's *dense, fine grain structure—uniform distribution of chemical elements—fast flowing and even cooling characteristics* —all of which contribute to the plus value of every CHATEAUGAY casting.

Add the fact that CHATEAUGAY castings are strong and tough . . . provide hard surfaces that resist heat, acid and wear . . . are surprisingly easy and economical to machine . . . and you'll see why leading foundrymen everywhere insist upon using this low-phosphorous, copper-free pig iron that consistently out-performs other irons.

Complete information and helpful metallurgical assistance on request. Write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

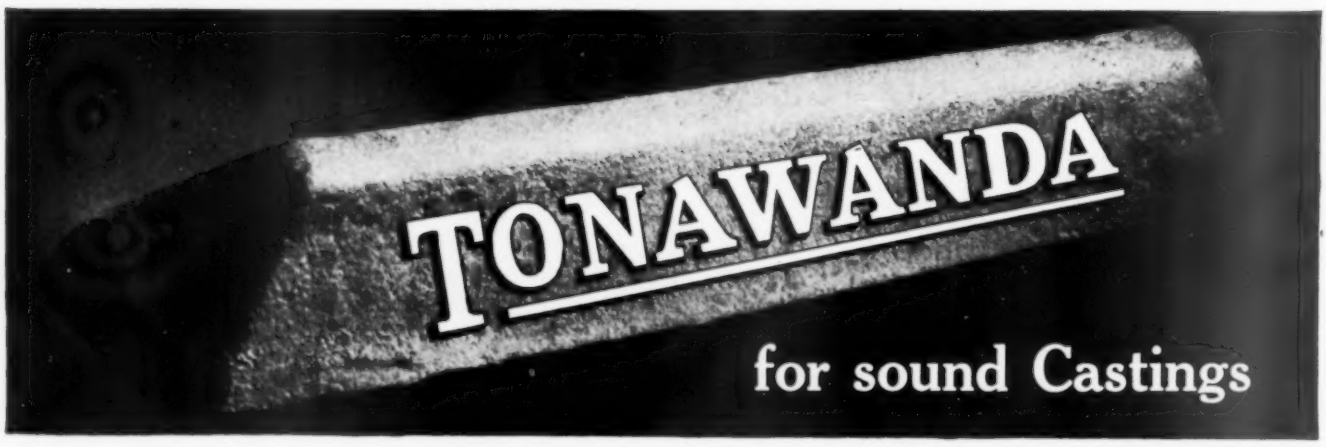
G-IRON

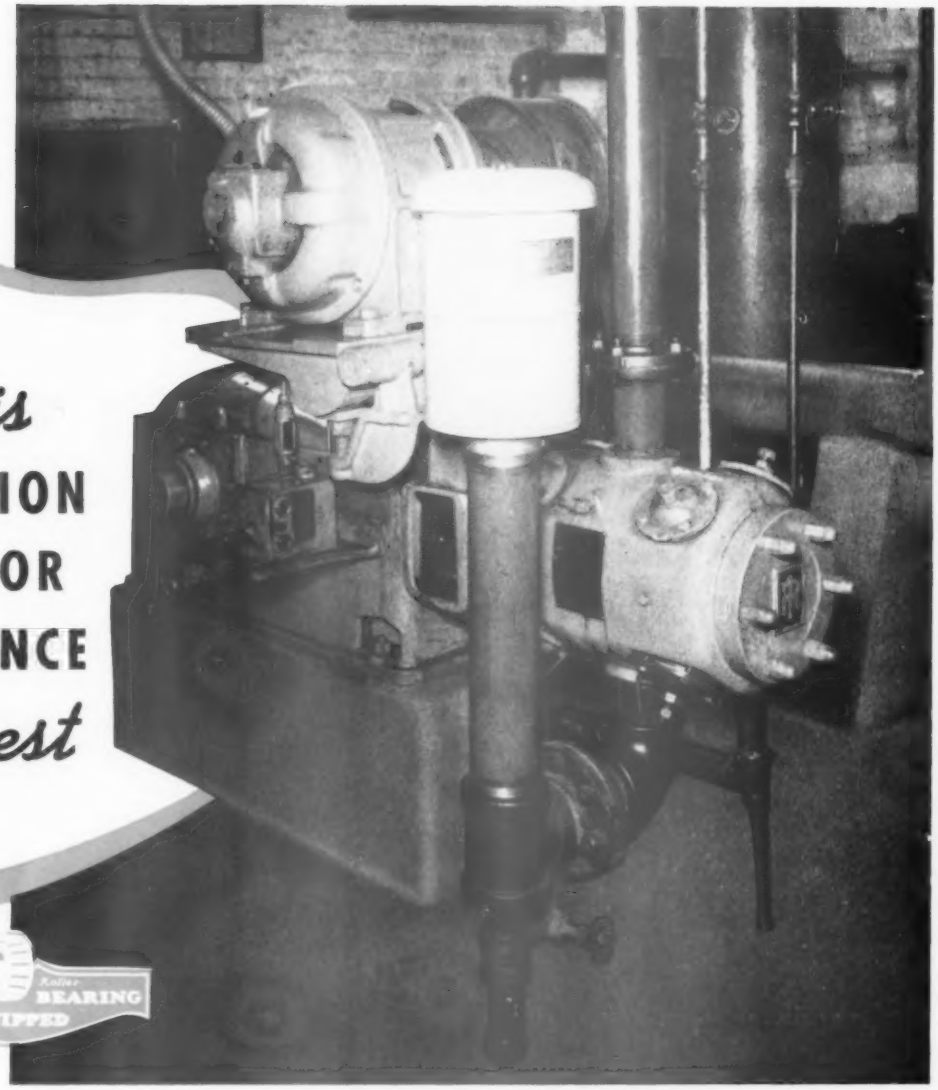
G-IRON is graphitized pig iron. A patented blast furnace process refines the grain structure of the pig—and this refinement follows through to the final casting. The finely distributed graphite increases fluidity and reduces chill in thin sections—improves machinability and helps overcome shrinkage and porosity between thin and heavy sections.

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION





Here is
ANTI-FRICTION COMPRESSOR PERFORMANCE
at its best

Tapered Roller TIMKEN BEARING EQUIPPED

This Ingersoll-Rand 7 x 7 ES-1 air compressor is equipped with Timken Tapered Roller Bearings on the crank shaft. Many years of compressor experience have proved that Timken Bearings meet every anti-friction requirement with utmost efficiency.

They eliminate friction and wear; carry radial, thrust and combined loads; and hold moving parts in correct and constant alignment. Furthermore, being made of Timken Fine Alloy Steel developed and produced in our own steel plant, Timken Bearings possess maximum strength and endurance under all conditions of service.

If you do not get all these advantages in your new compressor, you will not be getting anti-friction performance in full. To make sure of getting it, buy "Timken Bearing Equipped".

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

"Mulling the sand every time it is used has greatly improved the quality of our castings and reduced our scrap loss"

Our New Name Is
RELIABLE CASTINGS CORPORATION
The RELIABLE PATTERN & CASTINGS CO.
3530 SPRING GROVE AVENUE CINCINNATI 23, OHIO

March 14th
1947

National Engineering Co.,
549 W. WashingtonBlvd.,
Chicago 6, Illinois.

Attention of Mr. Bruce L. Simpson
President

Gentlemen:-

It was indeed a pleasure to have your Mr. Fuller call on us last week, not to sell us something, but merely to check on the molding system you installed for us some two years ago. Such personal interest is one of the reasons we have found our National installation so satisfactory; you did not forget us once the equipment was installed and paid for.

The installation of this sand handling equipment has given us advantages in labor saving, but most important to us has been the improvement in the conditioning of our molding sand. Mulling the sand every time it is used has greatly improved the quality of our castings and reduced our scrap loss.

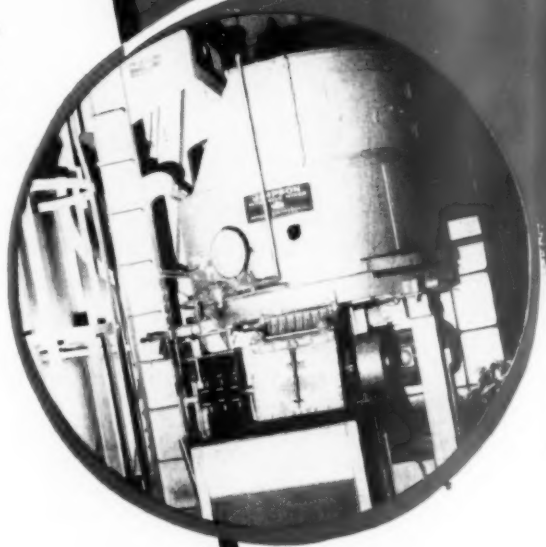
We have had very little maintenance on this system and are very much pleased with the installation and we thought you would like to have this tangible expression of our satisfaction.

Yours very truly,
RELIABLE CASTINGS CORPORATION
Arthur Kuhn, Secy Treas.

AK:LSB

- WOOD AND METAL PATTERNS
- PRESSURE CAST ALUMINUM MATCH PLATES AND COPE AND DRAG EQUIPMENT
- BRASS, BRONZE AND ALUMINUM SAND CASTINGS MADE TO ANY SPECIAL ANALYSIS
- PERMANENT MOLD ALUMINUM CASTINGS
- PERMANENT MOLD SEMI-FINISHED BRONZE BUSHINGS
- AMPCO AND EVERDUR CASTINGS

Right: Molding sand preparation plant at the Reliable foundry, showing storage bin, automatic discharge gate and skip hoist which carries sand to the Simpson Mixer on the platform. *Below:* Closeup view of the mixer, with sand delivery buggy below aerator.



1922 . . . 1947
OUR 25th ANNIVERSARY
Thanks To You!

FOUNDRY EQUIPMENT MANUFACTURER'S ASSOCIATION, INC.

NATIONAL ENGINEERING COMPANY

600 MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

. . . another example of the advantages offered to smaller foundries by SIMPSON *Intensive* MIXERS

• The advantages of Simpson Mixers are definitely *not* limited to larger iron and steel foundries. More and more non-ferrous foundries, including numerous smaller operators, are taking advantage of the lower production costs . . . lower operating costs . . . lower maintenance costs . . . less installation space required . . . faster production . . . and the constantly higher product quality available by the controlled mixing of sands in a Simpson Mixer.

A typical example of a small, yet complete sand preparing plant, designed around a Simpson Mixer, is demonstrated at the Reliable Castings Corporation. This unit provides extreme compactness with maximum sand storage capacity, and also permits the mixer operator to handle both sand preparation and distribution. Because of the mixer's location at hopper level, molding sand may be delivered manually by buggy, or by the conventional belt conveyor method.

Here, then, is a sand preparing plant designed especially for the smaller foundry . . . offering low original cost and a distinct saving in operating cost . . . applicable to all classes of foundry work. Let a National Engineer show you how to step up production with a Simpson Mixer installation. Write for details.

Moistmeter

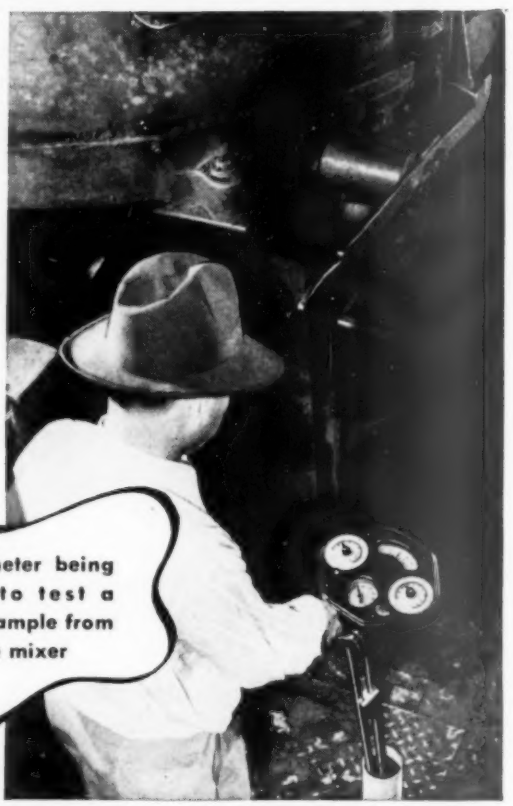
Fast • Portable • Accurate—Electric Moisture Tester FOR THE FOUNDRY

The Moistmeter is a versatile instrument that determines instantly the exact moisture percentage of either core or molding sand, on the floor or in the sand system.

It is ruggedly constructed, simple to operate and easy to carry around. Moisture readings can be taken at selected depths, from either a pint can or a large bin in just three seconds.

When you equip each sand preparation crew with the Moistmeter, you can control the moisture range within exactly specified limits with considerable improvement in your castings.

Moistmeter testing moisture of sand on the foundry floor.



Moistmeter being used to test a sand sample from the mixer

Write to Department "E"

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND · MOLD · MOISTURE · SULFUR · CARBON

CONTROL

SPACE SAVER

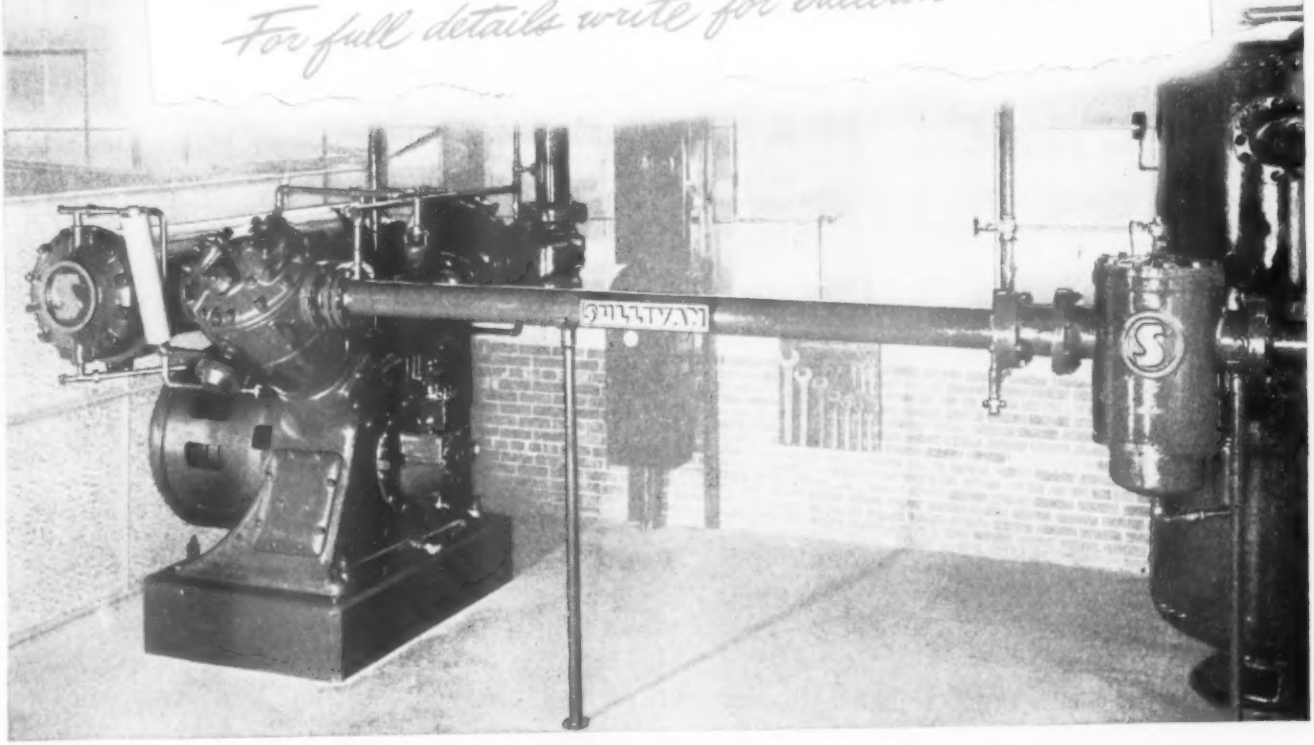
THAT PROVIDES LOW-COST COMPRESSED AIR

SERIES WN-112

for capacities of 378 to 1828 cfm, pressures up to 125 psi

If space is precious in your plant, that's one more reason why you'll want to specify the Joy WN-112 Compressor. It's more compact than other compressors of equivalent capacity because of its advanced design and use of alloy metals—and it operates more economically . . . gives longer heavy duty service. Installation is simple, and maintenance low.

For full details write for bulletin A-52



Joy Air Compressors

PORTABLE AND STATIONARY — ¼ HP TO 600 HP

ALWAYS DEPENDABLE!

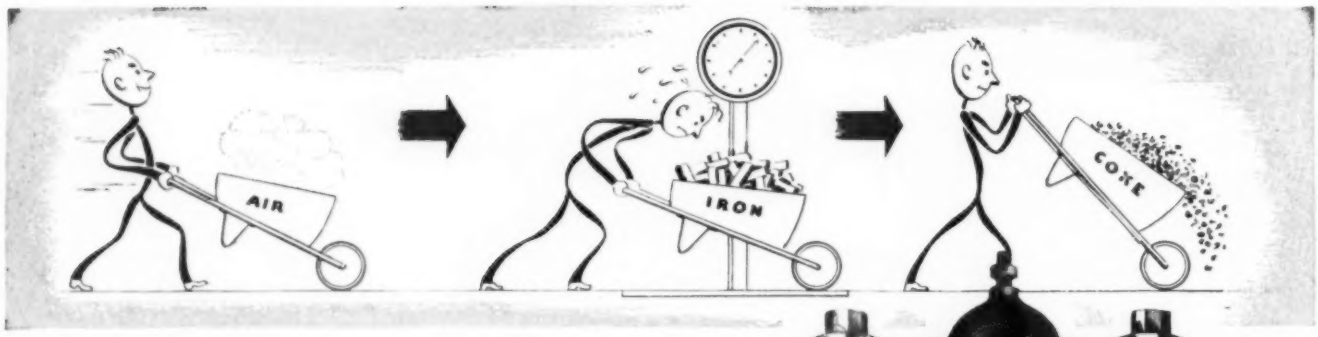
W&D 1512

Consult a Joy Engineer

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.



Uniformly better pours . . .

WHEN YOU WEIGH AIR TOO

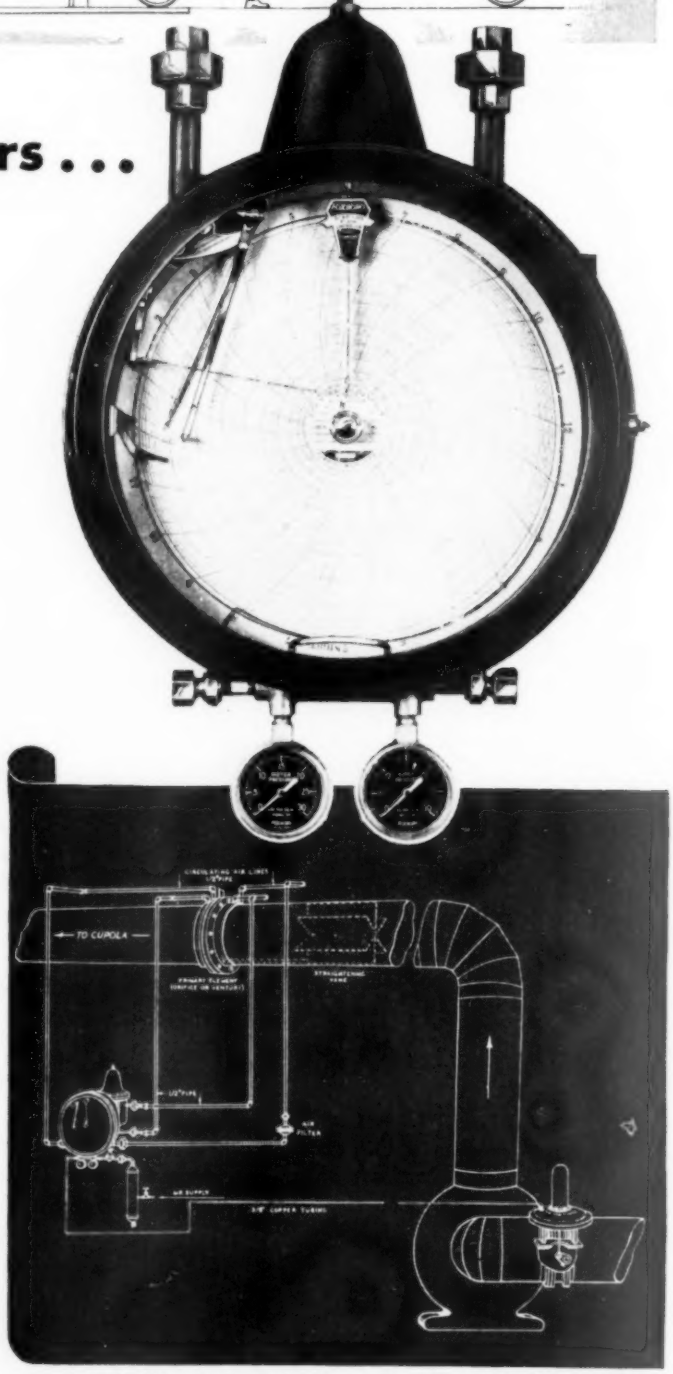
The air blown into your cupola is as important a part of the charge as the iron or coke. If you measure it *by weight* then you avoid the variations in cupola temperatures caused by changes in barometer, air blast temperature, or wind-box pressure.

BETTER PRODUCTION . . . AND MORE OF IT

Foxboro Air-Weight Controllers automatically control the air blast by weight instead of volume . . . maintaining uniform melting conditions week-in and week-out. Daily pours are uniformly hotter without burning. Pigging can be entirely eliminated. Every pour gives flawless quality castings from the first tap to the last.

The Foxboro Air-Weight Controller can be installed in a few hours. It is extremely simple to operate . . . inexpensive to maintain. Improved production will pay for it in a surprisingly short time. Let us send you complete details and names of nearby users. Ask for bulletin B-268. **The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U. S. A.** Branches in principal cities.

Visit Foxboro Booth No. 828 At The Foundry Show



Foxboro Air-Weight Controller is easily adapted to either positive type blower (as in diagram above) or fan type blower.

FOXBORO REG. U. S. PAT. OFF. **AIR-WEIGHT CONTROLLERS**

Scrub Foundry Air

With the Thunderhead Turbulence *of a Schneible Collector*

A Schneible system clears the air like a brisk summer thunderstorm . . . rids your foundry of dust and fumes permanently. Center of activity is the Schneible Multi-Wash Collector in which the uprush of contaminated air through the various impingement stages comes into cyclonic contact with the gravity-fed wash water. It's as natural as a thunderstorm, too—there are no moving parts to require repair or replacement.

The severe whirling agitation sets up a finely divided spray and series of water curtains that envelops every foreign particle . . . washes them down and out for disposal in a dewatering tank, so that water can be used over and over, if necessary. A final entrainment separator stage removes all free moisture. And the exhaust fan is on the *clean* air side—no corrosive or erosive action on motor or blades.

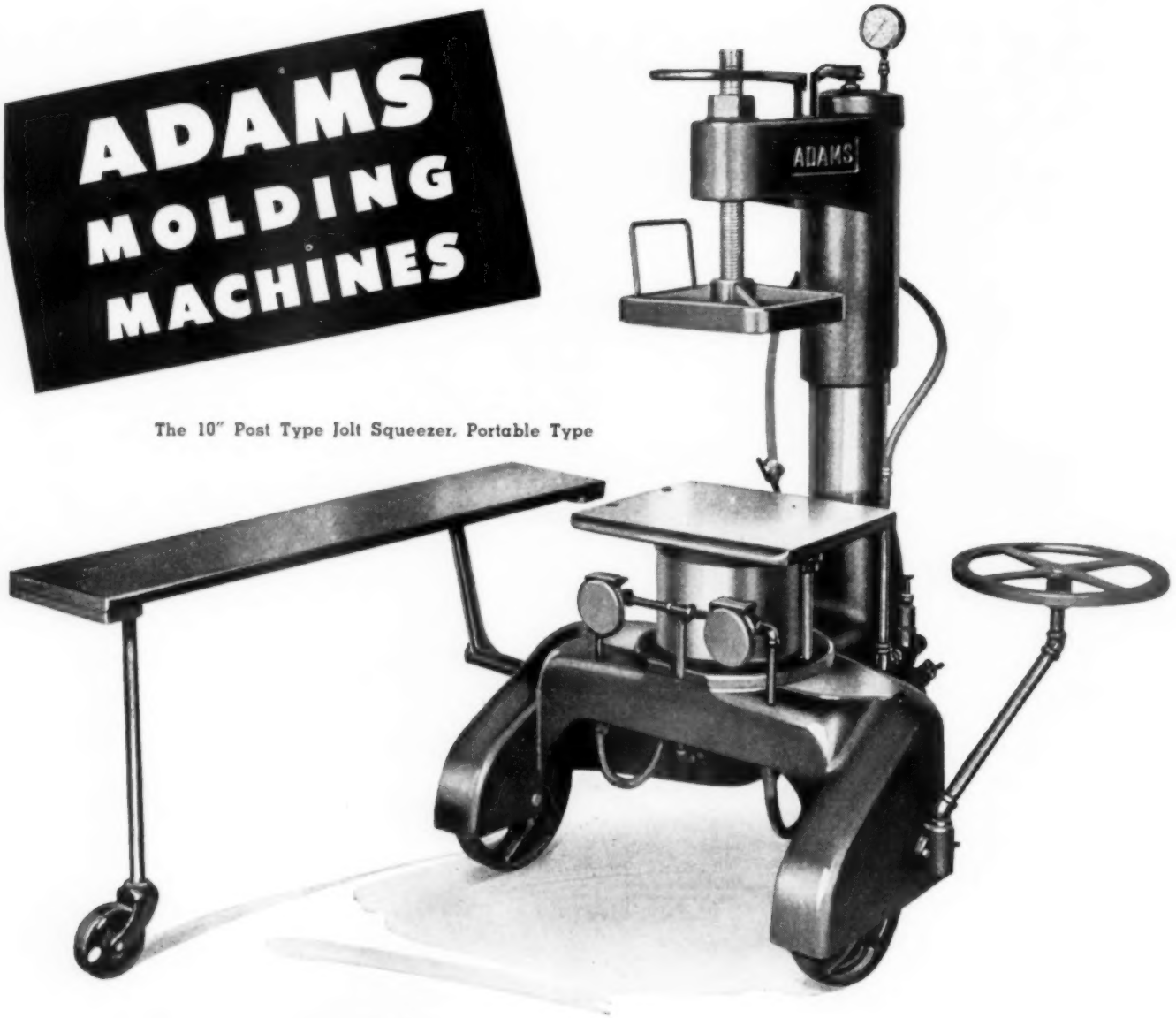
That's the core . . . leading to it and from it are the Schneible hoods, ductwork, "Velocitraps," settling and dewatering tank, and pumps that assure clean air in every corner of your foundry and easy, economical disposal of collected material. Find out about the hundreds of Schneible engineered installations giving automatic, trouble-free handling of contamination in foundry air. Send for Bulletin 47.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St., Detroit 16, Mich.
Engineering Representatives in Principal Cities

SCHNEIBLE

LIQUID VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

ADAMS MOLDING MACHINES



The 10" Post Type Jolt Squeezer, Portable Type

Post Type

Adams post type molding machines are offered in 10" and 12" cylinder sizes in both portable and stationary models for jolt-squeeze and jolt-squeeze-pattern-draw service. These machines feature the Adams valveless jolt mechanism, enclosed construction and a safety device with which air cannot be admitted to the squeeze cylinder until the head and table are in proper alignment. All hose and pipe lines, other than those leading directly to operating controls are concealed and protected. Full details are given in Catalog No. 705. Write for a copy.

THE ADAMS

DUBUQUE,

MOLDING MACHINES . . . . . FLASK

The 12"-38" Adams
Jolt Squeezer, Portable Type

Side Rod Type

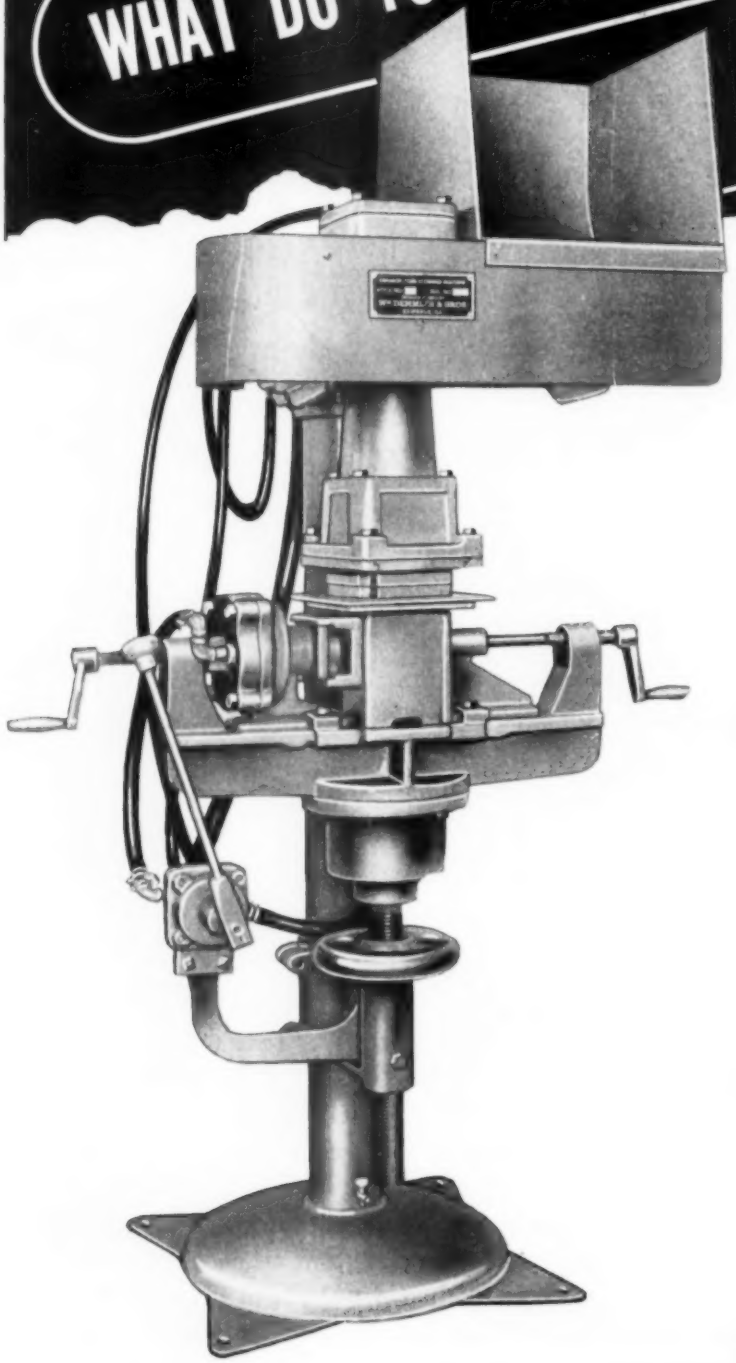
Adams side rod type molding machines are offered in 10" x 32", 12" x 38" and 16" x 42" sizes for jolt squeeze service and 10" x 32" and 12" x 38" sizes for jolt-squeeze-pattern-draw service. All models are made in portable and stationary styles. Valveless jolt mechanism and enclosed construction are standard on these machines and the steel head is perfectly counter balanced by flat coiled vanadium springs in dust-proof closures. Catalog 705 describes these machines fully. Be sure and get a copy. THE ADAMS COMPANY, 700 Foster Street, Dubuque, Iowa.

COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

WHAT DO YOU WANT IN A SMALL CORE BLOWER?



1. First of all, dependability—

The new DEMMLER No. 55, like all DEMMLER core blowers, has earned its reputation for quality and dependability through performance. Ask any foundryman who uses these machines what he thinks about DEMMLER dependability. The blow valve is a trouble-free diaphragm type valve, and the maintenance item is reduced to a minimum. Here is a *real* core blower—a machine that will still be on the job years from now, giving perfect satisfaction because it is built to last!

2. Rapid Production—

A single hand valve operates both vertical and horizontal core box clamps and blows the core—all in 3 seconds!

To fill the sand magazine, just push the magazine over to register with the sand supply hopper. There are quick, easy adjustments for raising the table and moving the chuck jaws.

The sand magazine has sliding blow plates to speed up job changes.

3. Ease of operation—

No previous core making experience or special skill is required, and girl operators may be used. Sand magazine and carriage are light aluminum castings, mounted on ball bearing rollers.

The DEMMLER No. 55 is your dependable, yet economical, solution to the rapid production of high quality small cores. It's popular because it's a profitable machine to own.

The New DEMMLER No. 55

Will accommodate core boxes 11" long

—handle cores weighing up to 3½ pounds.

Sizes of available sand magazines: 4 1/2" x 9 1/2" opening at bottom
6" x 8" " " "
10" diameter " " "

Weight of machine . . . . . 550 pounds

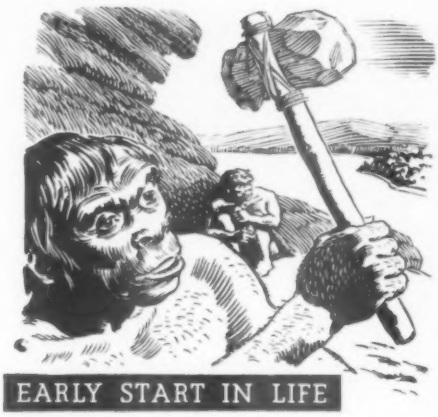
Wm. Demmler & Bros.

KEWANEE, ILLINOIS

Send for Illustrated Specification Sheet

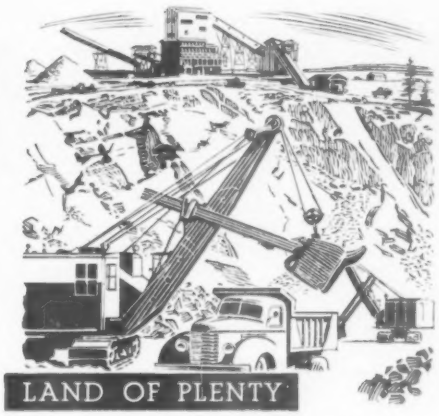
ONE OF A SERIES OF STORIES ABOUT ALLOYING METALS...WHERE THEY COME FROM AND HOW THEY ARE USED

THE STORY OF SILICON



EARLY START IN LIFE

1 Way back in the Stone Age are found the first uses of silicon—in the tools and weapons used by prehistoric man. These were made of flint, which is almost pure silica, and in silica many centuries later the Swedish chemist Berzelius discovered the element silicon. He produced the world's first ferrosilicon in 1810.

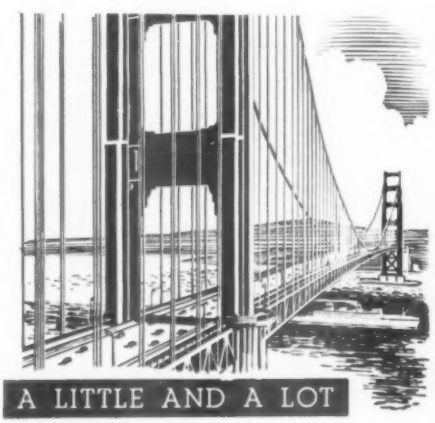


LAND OF PLENTY

2 "Earth former" is what silicon has been called, for it is present in most all rocks, clays, soils, and many semi-precious stones. More than one fourth the earth's crust is silicon—the most abundant element, next to oxygen. Electromet digs into mountain after mountain for high-quality silicon ore.

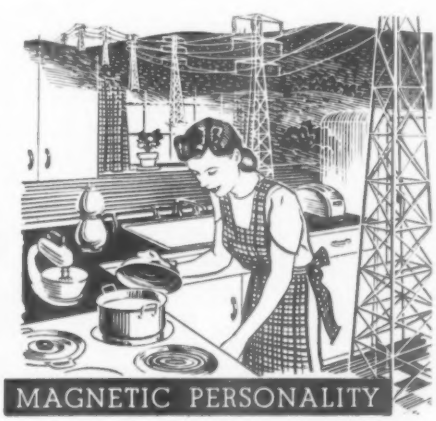
HOUSECLEANING SPECIALIST

3 Silicon does a "clean-up job" in iron and steel production, serving as scavenger and deoxidizer. From the molten bath it removes harmful oxides and gases. Silicon is used for refining practically all alloy steels and many grades of carbon steel. It is second only to manganese in its usefulness in steelmaking.



A LITTLE AND A LOT

4 From about 0.20 to 1.50 per cent silicon goes into many structural steels—such as those used for highly stressed parts of bridges. In larger percentage, sometimes as much as 17 per cent, silicon equips cast irons to handle highly corrosive acids in chemical plants. Silicon is also a softener in cast iron.



MAGNETIC PERSONALITY

5 The heart of the mysterious transformer is made of steel containing silicon. Silicon is essential in sheet steel for electromagnets, generators, and other electrical apparatus because of the special magnetic and electrical properties it imparts to the steel. It has brought about tremendous power savings.

Cream Of The Crop

Electromet's interest in silicon dates back almost 50 years, for in 1898 the broad patent claims of de Chalmot were assigned to the Willson Aluminum Company, one of the predecessors of Electro Metallurgical Company. With its long experience in ferro-alloys production, Electromet naturally knows how to give all its customers alloys of high quality and purity. Write for the booklet "Electromet Products and Service," which will tell you more about silicon and the other Electromet alloys.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet

TRADE-MARK

Ferro-Alloys & Metals

AO 5X166 HEAT GLOVE — Clute cut. Heavy lining. Reinforcing leather strap around crotch of thumb.

AO 6X151 ONE-FINGER HEAT MITTEN — Heavy lining. Short cuff. For a full mitten for similar service ask about **AO 6X180.**

Here's a Heat Glove and Mitten

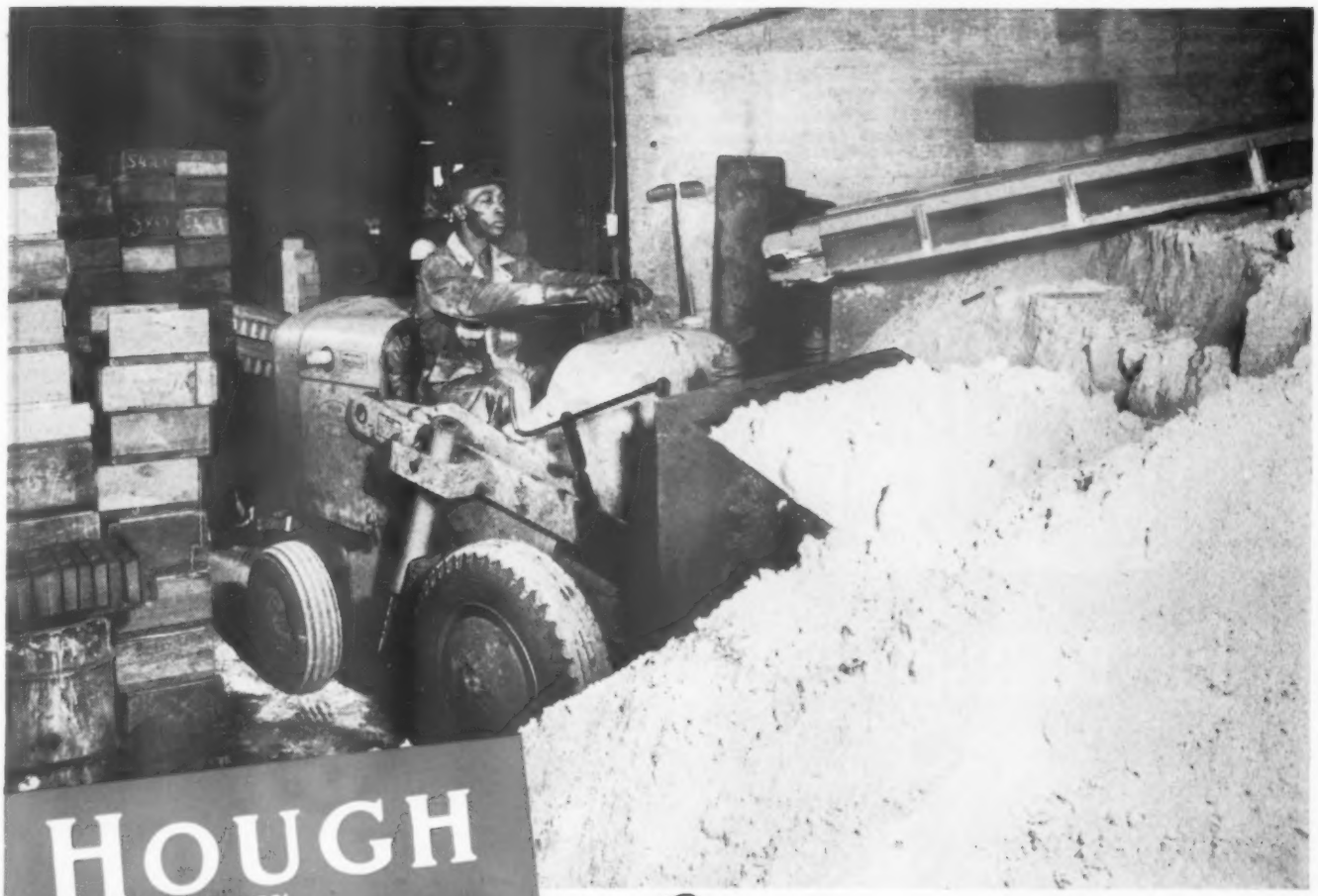
that will WEAR *and* WEAR *and* WEAR

Typical of AO's *standard* line of safety clothing for special services are the Heat Glove and One-finger Heat Mitten of chrome-tanned split horsehide leather, specially tanned to resist heat. Operations such as die casting, drop forging, block bending in shipyards, steel mill coil tying and others demand a material that can take both heat and abuse—and these AO products provide it. Ask your AO Safety Representative about the complete line of AO gloves, mittens and hand pads in cowhide and asbestos.

Safety Division

American Optical COMPANY

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



HOUGH
SAY 'HUFF'
Payloader
PATENTED

Cuts Labor Turnover
At Federal Malleable Co. Milwaukee

Above: The HA picks its way between storage bins and crates of molding cores.
Below: The HA dumps a load of sand next to mixer — ready for instant use.

With the installation of a Hough HA Payloader to handle sand and other bulk material, the Federal Malleable Co. of Milwaukee has experienced a decided decrease in labor turnover accompanied by a general improvement in employee morale.

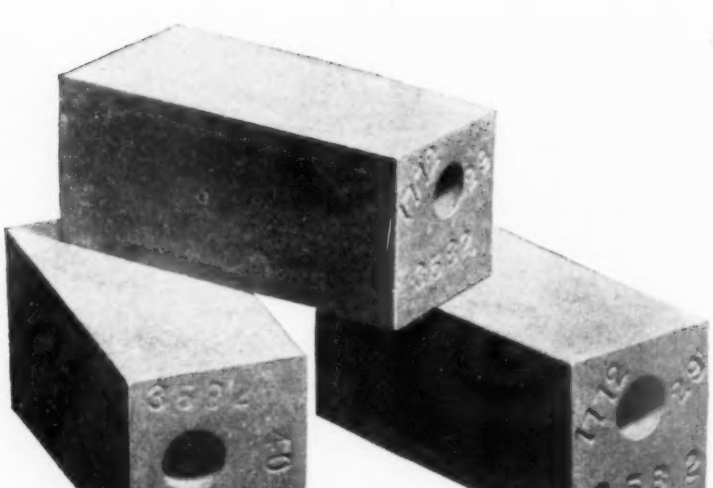
One man and the Payloader has taken over the backbreaking jobs of handling sand, coal, cores and other foundry material, releasing manpower urgently needed in other departments. Speedily twisting and turning in congested aisles and storage bins, the HA loads, carries, and dumps — working from one end of the foundry to the other, providing mobile horsepower wherever and whenever it is needed.

A Hough Payloader in your foundry will solve your labor problems — speed up production and increase the over-all efficiency of your plant.

Send today for complete information on the 10½ cu. ft. Model HA, the ¾ yd. HF and the 1 yd. HL.

THE FRANK G. HOUGH CO.
MATERIAL HANDLING EQUIPMENT SINCE 1920
703 SUNNYSIDE AVE. • LIBERTYVILLE, ILL.

DEPENDABLE SLAG HOLE BLOCKS



Slag hole block failures during a continuous-pour cupola run cease to be a problem with CARBOFRAX silicon carbide blocks on the job.

Retention of uniform hole size is assured by the dense slag-resistant CARBOFRAX blocks. Even with the blast on, rapid cutting away of this opening is avoided successfully. For runs of 18 to 24 hours duration, the slag stream stays almost constant. Troublesome, expensive shutdowns necessary for slag hole block replacement are eliminated.

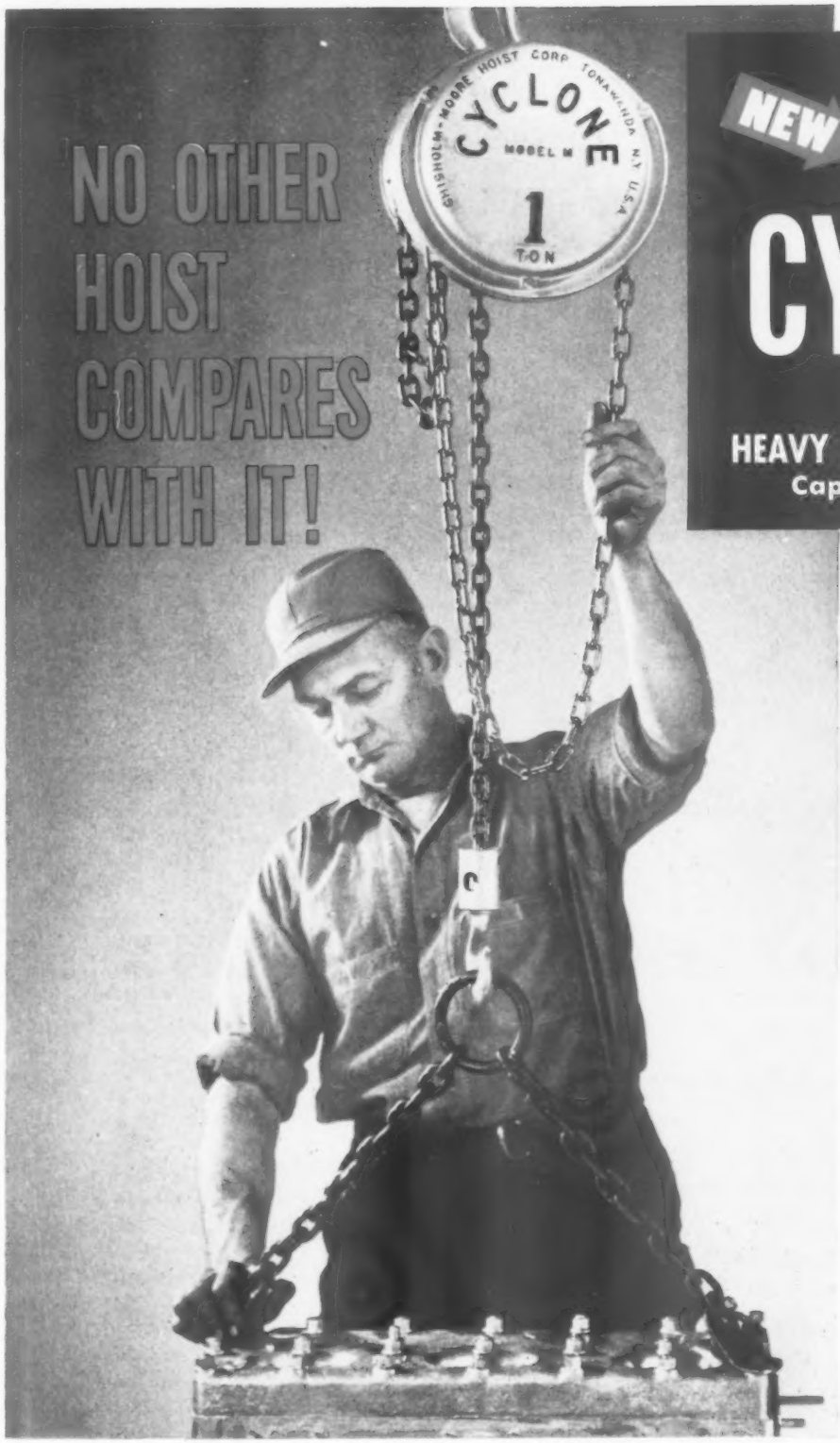
In many plants, CARBOFRAX blocks are constantly proving their dependable durability. You, too, may profit by their use. Complete information, including stock sizes and dimensions of blocks for which moulds are available, can be obtained promptly by writing direct to Department L-117, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

CARBOFRAX Slag Hole Blocks

BY **CARBORUNDUM**

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company



NEW CM

CYCLONE

Model M

HEAVY DUTY HIGH SPEED HOIST

Capacities from ¼ ton up

- **96% EFFICIENCY** — conserves worker energy and increases productivity
- **42% FEWER PARTS** — simplifies maintenance
- **63% LESS WEIGHT** — yet definitely a heavy duty hoist
- **Plus SEALED-IN LIFETIME LUBRICATION** — simplifies servicing... prolongs life... maintains efficiency
- **Plus HERC-ALLOY CHAIN** — America's First and Safest Steel Load Chain

The Cyclone Model M Heavy Duty Hoist is entirely new, completely different. Size and weight have been greatly reduced, and strength and durability greatly increased through the use of today's stronger alloys of steel and Alcoa aluminum. Efficiency and ease of operation have been increased to new high levels through the use of precision ball bearings at all rotating points. The many advantages of this unusual hoist are being demonstrated daily on-the-job by thousands of Cyclone Model M's already in service. *Ask your distributor* to show it to you.

● **New type load brake gives smooth, positive control at all times... exceptionally valuable in spotting or assembly work. Famous CM "Herc-Alloy" double duty alloy steel load chain is standard equipment on all models. The 1-ton model weighs only 35 pounds, has a minimum headroom of only 13⅜".**

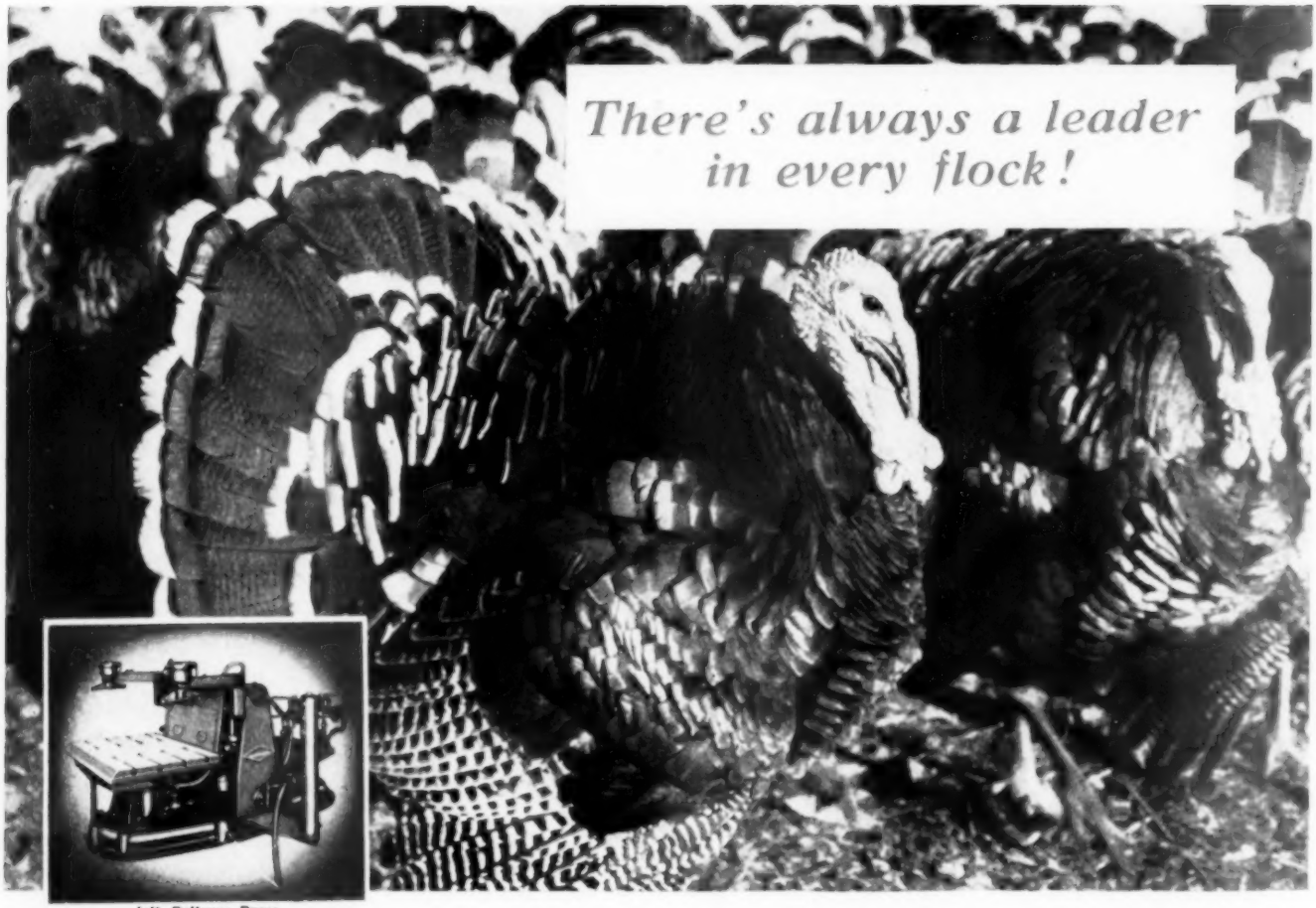
CHISHOLM-MOORE

HOIST CORPORATION

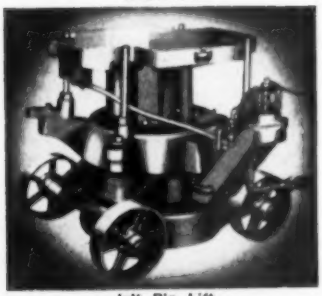
(Affiliated with Columbus-McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

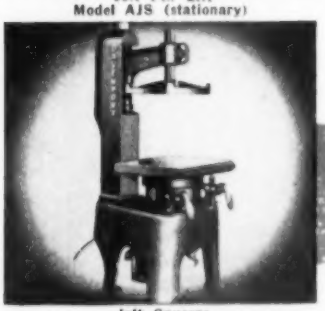
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles



Jolt Rollover Draw
Model SA


Jolt Pin Lift
Model AJS (portable)

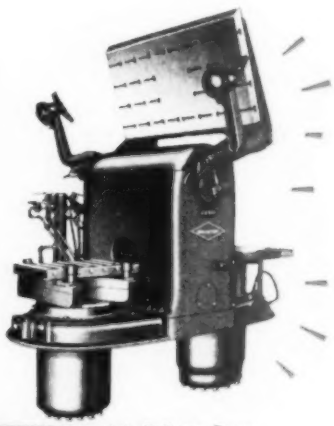
Jolt Pin Lift
Model AJS (stationary)


Jolt Squeeze
Model 10JX (stationary)

SELECT THE BEST !

When you are buying a molding machine, it is easy to select the best. Davenport foundry molding machines have proven themselves in world-wide foundry production. They are sturdy, dependable and accurate, and they will give you better castings in less time at a lower cost.

Write today for your copy of the Davenport molding machine catalog.


Jolt Rollover Draw
Model A

DAVENPORT MACHINE AND *Foundry Company*
DAVENPORT IOWA U. S. A.

Canadian Representatives: Canadian Foundry Supplies & Equipment, Ltd., Toronto and Montreal

REDUCE CASTING COSTS

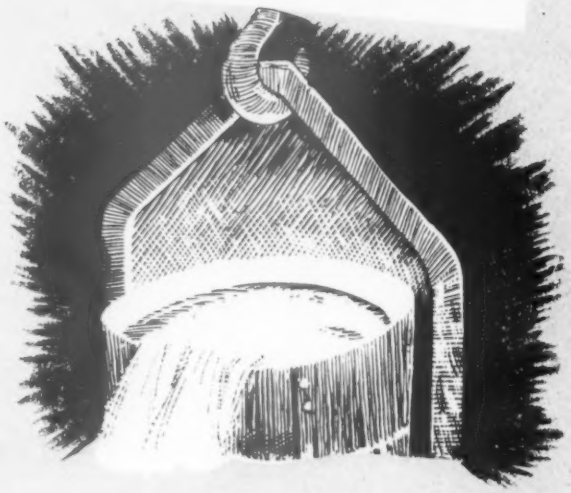
By Using the NEW and MORE POTENT

CASTFLUX
TRADE MARK REG.

The National Dual Purpose Flux

on the RISER and in the LADLE

Get More Sound Castings!
Reduce Miss Runs!
Reduce Metal Remelting!
Speed Up Production!



Labor costs are up! Material costs are up! Shortages of pig iron, inferior scrap and coke all add to production costs.

Under normal conditions Castflux effects sizeable economies in operation. With today's adverse conditions, the value of Castflux is even more pronounced.

In the LADLE...

Castflux offsets the negative factors caused by inferior scrap and coke by acting as a deoxidizing and purifying agent, removing occluded oxides and gases, and by bringing to the surface slag, dirt and foreign particles so they can be skimmed off.

This New and More Potent Castflux costs only

6¢ to 10¢ per ton
OF METAL TREATED

an insignificant price for sounder, closer grained castings, fewer rejects and miss runs.

On the RISER...

Castflux substantially increases the temperature of the metal because of its highly exothermic action.

CASTFLUX is Sold on this
UNCONDITIONAL GUARANTEE

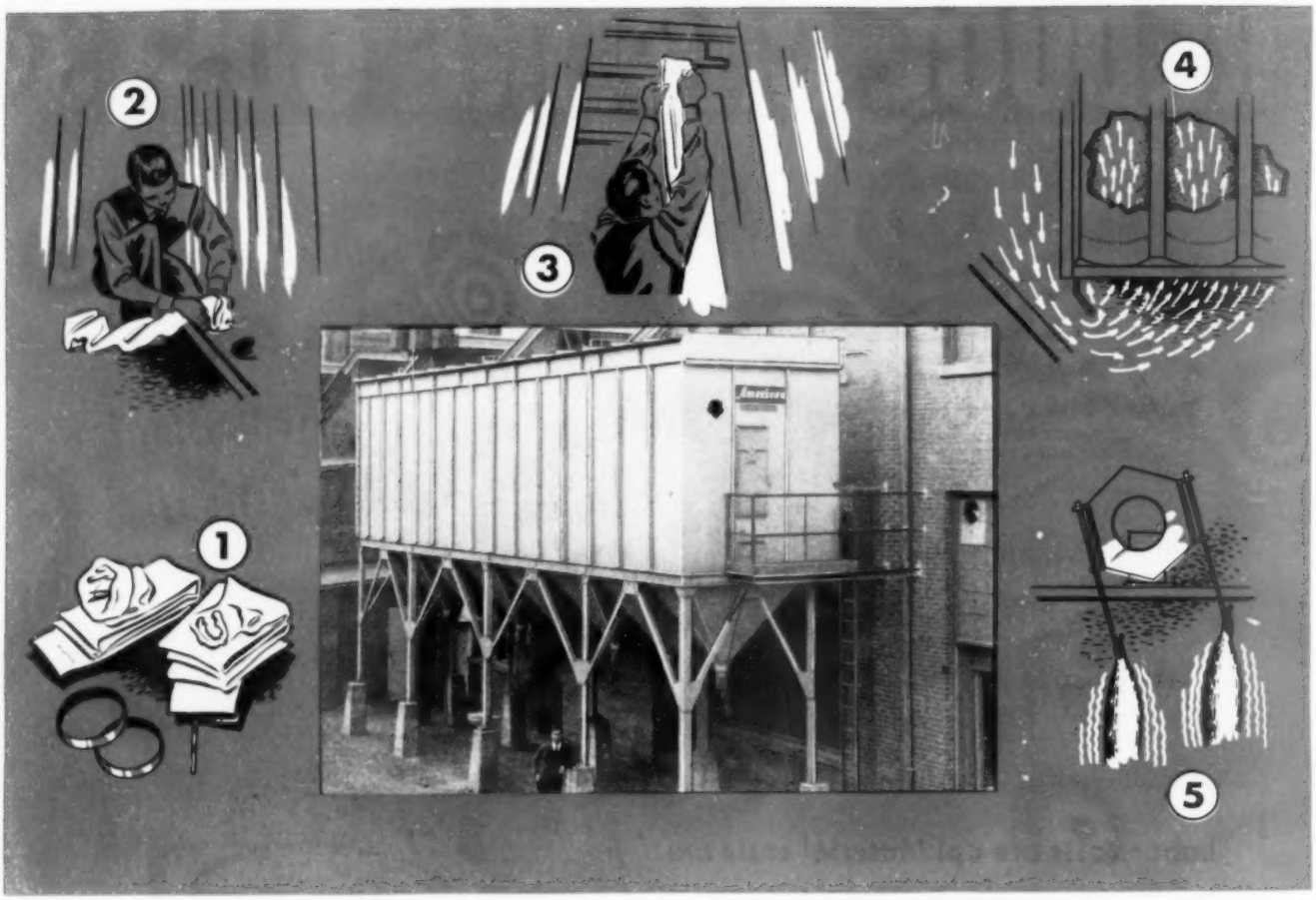
Unless our representations are proven within 30 days after receipt of material, it can be returned at no expense to you.

• • •

NATIONAL

PIGMENT COMPANY
2115-2117 E. YORK STREET
Philadelphia 25, Pa.

Sales Agencies
Throughout the U.S.A.
and Abroad



Dustube keeps both your dust and your expenses under control

Certainly—dust is wasteful, dust is a breeder of high costs, dust is the enemy of efficiency. But—SO ARE HIGH MAINTENANCES AND OPERATING EXPENSES! So when it comes to buying dust collection equipment, be sure you get a machine that not only DOES ITS JOB WITH HIGH EFFICIENCY, but can be installed and operated at a MINIMUM OF COST!

Such a machine is the American Dustube which gives *peak* performance (efficiency by weight; 98% and more) along with operation and maintenance that are consistently *low-cost.*

This means *more* than a method to rid your plant of dust. It means a machine carefully engineered to do a superb task of dust-removal, PLUS keeping your expenses down at all maintenance-points. It means cost-cutting economy of original installation. It means equal cost-cutting in the simplicity of daily operation. *It means a machine made to save you money.*

1. Tubes are compact, light, easy to store, economical to ship; they are never under tension . . . never in contact with metal which may abrade or corrode the fabric.

2. DUSTUBES are readily accessible from a central walkway. The economy of maintaining them is emphasized by the fact that ONE MAN only is required for quick, clean inspection or replacement. NO TOOLS are needed.

3. Tubes are easily and quickly inserted or removed. Their condition can be seen at a glance. Only very fine float dust reaches these tubes, *never* coarse cloth-wearing particles.

4. Extra-fine dusts (silica dust and others) are trapped with nearly 100% efficiency by weight. Discharged air shows less than 10 million particles per cubic foot from 2 to 10 microns in size.

5. Dust is completely removed from the filter tubes, which are shaken like a rug while deflated and limp. Result: lower operating resistance, longer cloth life, a direct saving in horsepower.

Write for Catalog 72

Containing valuable ventilation data, this 54-page illustrated book shows the full line of Dustube dust-collection equipment. It is yours on request.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana

dustube
DUST COLLECTORS

Gray Iron Founders' Program Constructive

A NEW and important chapter in the progress of the Gray Iron Founders' Society was inaugurated at the recent annual meeting of that organization held in Milwaukee. Following a thorough consideration of the major problems now facing the gray iron castings industry, and a careful study of the various avenues of service open to the society, the board of directors launched an intensive program for the coming year. Activities to be undertaken during the next twelve months are closely integrated with an overall plan covering a ten-year period.

Recommendations for future society developments are based upon the results of a survey of the gray iron foundry industry recently completed by Raymond L. Collier, executive vice president of that organization. This study paints an interesting and valuable picture of the structure of the gray iron industry, its size, production history, principal markets, methods of selling, and major problems.

To provide a more efficient organizational framework, which in turn will permit the society to render greater service to all members, the board of directors has established forty local groups covering the entire country. Two or more of these groups have been combined into twelve districts for the purpose of electing society directors, thus assuring representation for each section of the country.

By building a foundation at the local level, the society will be better able to develop acquaintances and friendships among all of its members. Furthermore, the new group organization should accelerate the work in establishing local cost groups which has been carried on so enthusiastically during the past year by the society's cost committee headed by A. E. Hageboeck. The new plan provides that during the coming year the society will undertake the promotion of gray iron castings through business paper advertising, a balanced technical development program and extensive public relations activities.

Since the end of the war, gray iron foundries have had tremendous backlogs of orders. While the basic character of gray iron castings indicates a continuing demand for a considerable period, the time may not be far distant when needs will more nearly balance ability to produce—when it will be necessary to sell the product.

Co-operative action on a sound program of society activities should be of great assistance to the industry in meeting tomorrow's competition.

Frank G. Steinebach

EDITOR

Casting f

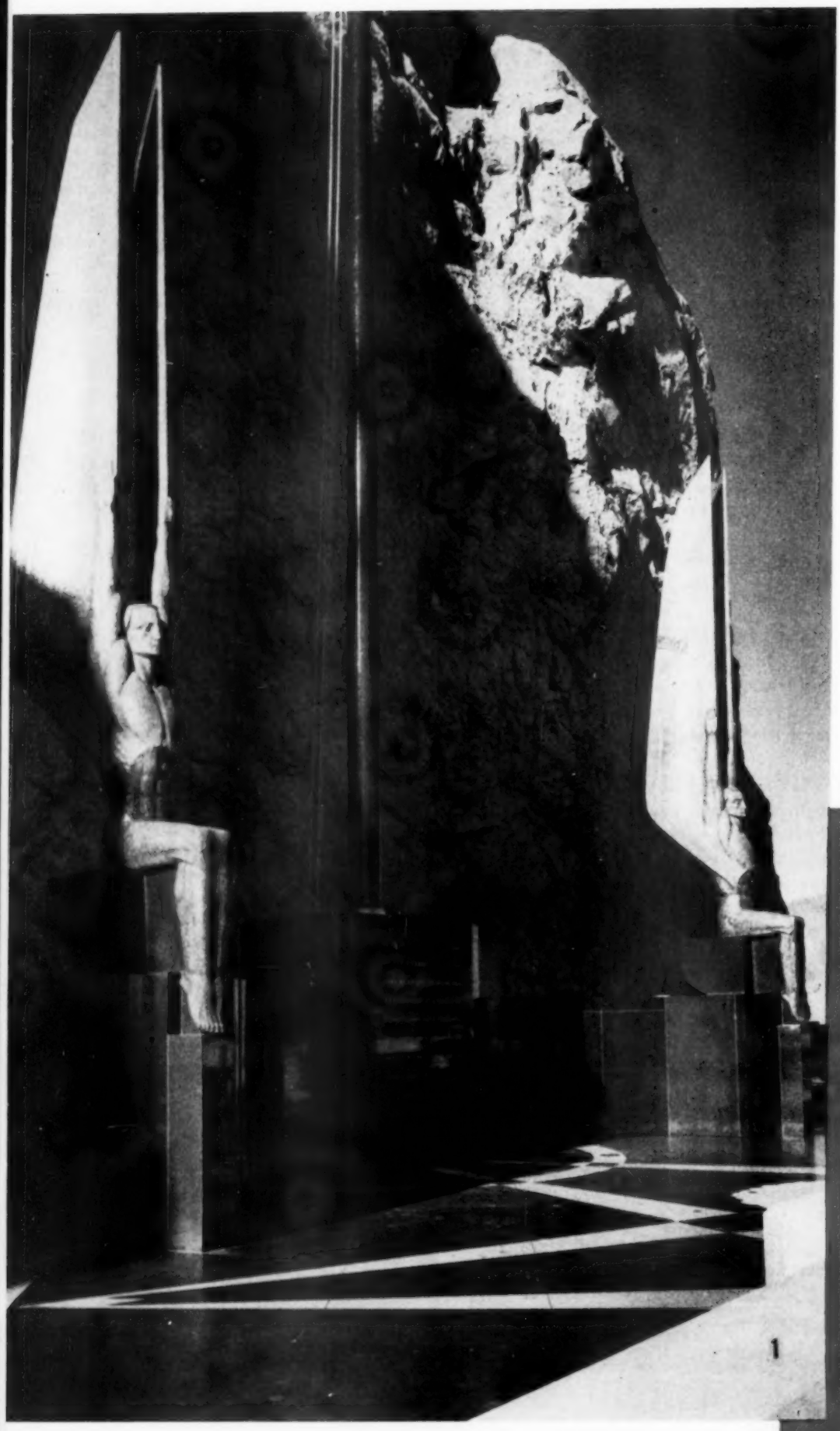
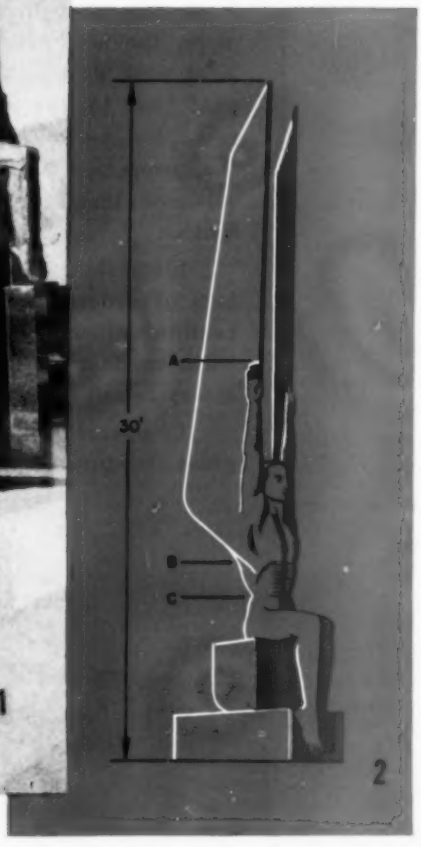


Fig. 1 — Bronze figures at the Nevada end of Hoover dam will sit there in silent majesty so long as grass grows or water runs or until rivers cease to flow down to the sea

Fig. 2—Sections joined at *A*, *B* and C



By PAT DWYER
Engineering Editor
THE FOUNDRY

Artistic Bronzes

TECHNIQUE employed in molding and casting statuary and other objects of art either in base or precious metals, has changed but little since Aaron, the first master molder of record, cast a golden calf for the wandering children of Israel. Quite true, modern commentators see nothing in this story but an allegorical reference to Wealth, with a large capital W, which through all ages and to all people has been an object of awe and reverence, if not of actual adoration.

Even if this famous ancient golden calf was a myth, sufficient authentic evidence remains to prove that metal has been cast into statuary and other ornamental shapes from an exceedingly early period in the history of mankind. Bronze bells and other castings have been found in China bearing marks indicating that they were molded and cast 2000 years before the beginning of the Christian era. A certain amount of mystery surrounds the ultimate fate of the immense columns and other bronze castings which Solomon had made for the temple, but the story of their production is too detailed and perfect to permit any doubt of their onetime existence.

Without stretching the imagination to any degree near the elastic limit, one might hazard the guess that most of the bronze found its way to Rome after the imperial legions had sacked and ravaged Jerusalem in fulfillment of a phophecy that not one stone should be left upon another. Referring back to the opening paragraph, one might venture the assertion that the basic technique of war, the senseless and wanton destruction of people and property, has changed but little since Tubal Cain fashioned the first hand-flung spears.

Cunning artificers were required to fashion the columns and other castings, but any barbarian could smash them by building a fire inside and outside, so that the pieces with other war loot might be loaded on the dusty camel trains and driven either overland through Asia Minor and Greece, or down to one of the great Mediterranean ports of Alexandria, Carthage, Joppa, Tyre, and thence by slave-manned trireme to the sovereign city sitting proudly on her seven hills.

This theory may account, at least to some extent, for the prominent place taken by Italy in the field of artistic metal work in early ages, a place maintained in a fairly able manner up to the present. A large quantity of bronze scrap, large for the time and place, turned the eyes of artists to that material as a medium for expressing and perpetuating the results of their creative genius.

Extent to which artists were skilled in various lines may be inferred from the autobiography of one of the most notable of his time. Benvenuto Cellini was a sculptor, a painter, a jeweler, an engraver on precious stones and metals, and a highly skilled molder and melter. In addition—which of course has no bearing on the present discussion, but is introduced merely to throw a sidelight on the amazing versatility, vitality, violence and wide range of accomplishments of this alliterative artist—he was a gambler, a swordsman, a gentleman of fortune, a swashbuckling bravo with a feather in his hat, and with an irresistible attraction to and for the ladies. Taking into account the time devoted to his fights and his amours, one is amazed not at the extent of the masterpieces in bronze and precious metals that flowed from his nimble fingers, but in wonder where he found time to execute even the simplest. In our present highly decorative language he probably would shine as the original prowling wolf from Vesuvius, and every night was his night to howl.

The Artist Did Everything

Cellini and those who followed him for many years needed no outside assistance. Every step in the process from the conception of the image to the final unveiling of the completed figure represented the effort of one man. His workshop frequently served the double purpose of a dwelling place and a factory.

Actual methods of producing statuary and other somewhat related types of bronze castings are almost the same as they were in the time of Aaron, Solomon or Cellini, with the single exception that one man's work now is divided among several men. Modern traveling cranes have taken the place of the old gin pole and pulley blocks. Electricity, oil, gas and coke have replaced charcoal as a melting medium. In fact, the art has become so commercialized in

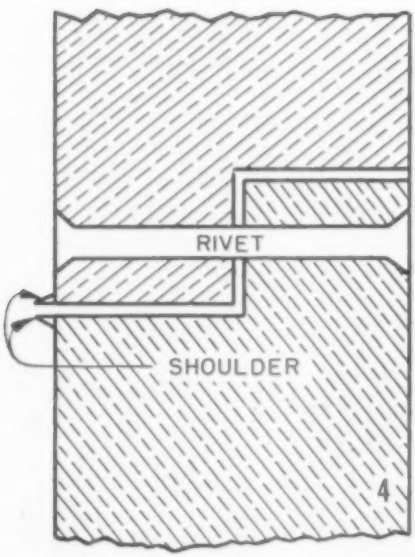


Fig. 3—Artist is skilled in the use of many tools

Fig. 4—Typical section of Roman joint showing construction and rivet connection

Fig. 5—Groups and large figures are cast in sections. The castings are chipped, cleaned and assembled in accordance with the artist's conception

Fig. 6—Molds made in steel flasks

recent years that it is no longer mysterious—to those on the inside. The general public knows as much now about the process as the general public always knew, and that is practically nothing!

To the general public, including a vast army of foundrymen, the entire process is wrapped in mystery. This is a natural state of affairs in view of the fact that probably not more than a dozen shops out of a total of over 5000 in the United States engage in the production of this class of castings. Few of these shops are large, as the term usually is understood, and none is engaged exclusively in the production of statuary. Most of these shops limit their activities to ornamental castings which of course, includes statues, but several handle a general line of nonferrous castings to the extent of 50 per cent or more of their capacity.

Among this small group the bronze foundry of the Roman Bronze Works, Corona, L. I., stands out prominently through a long and successful career and through the long list of notable castings that have been turned out. One of these was the recently completed figure of Thomas Jefferson, now erected in the Jefferson Memorial Pavilion in Washington. Another is the last crowning feature to Hoover dam, the artistic touch which marks the conclusion of any piece of work by a master hand. Two giant bronze figures 30 ft high 40 ft apart and flanking a flagstaff 145 ft high symbolize the height and depth and strength of a republic conceived in liberty, dedicated to the principle that all men are equal and that nothing is impossible to men with tools and with the will, the skill and the ability to use them.

The Hoover dam figures (Fig. 1) were conceived and executed by Oskar J. W. Hansen, sculptor, Chicago. The bronze castings were molded and cast at the Roman Bronze Works, Corona, L. I. The following inscription on a bronze plaque at the base of the flagstaff requires no elaboration: "It is fitting that the flag of our country should fly here in honor of these men who, inspired by a vision of lonely lands made fruitful, conceived this great work, and of those others whose genius and labor made that vision a reality." The magnificient bronze figures face the Black Gorge of the Colorado and bid fair to sit there in silent majesty so long as grass grows or water runs, or until rivers cease to flow down to the sea. In other words, tourists need not hurry. The figures will be there next summer.

Realization of the great height may be inferred from a popular post card illustration showing two small visitors looking upward at the figures with proper awe and admiration. Sixty years hence they brazenly will tell their grandchildren that these figures were at least 300 feet high. The figures, about 40 ft apart, are erected on a polished semicircular granite base with the flagpole in the center. The figures face down stream and across the 1000-ft gorge of the river. Each figure is 30 ft high and weighs 4 tons.

The accompanying sketch (Fig. 2) shows where the plaster pattern was parted to facilitate work in the foundry. The first parting at *A* included the upper part of each wing. The second parting at *B* separated the lower part of the wing from the torso. The third parting line at *C* separated the torso from the lower part of the body, the legs and feet.

At each joint line the section was provided with a Roman joint as shown in Fig. 4 in exaggerated form for clarity. Some dead and forgetten genius developed this simple and highly ingenious type of joint for bronze figures probably 2000 years ago. Like so many other shop kinks it was so perfect that it has been used ever since. In recent years welding equipment has facilitated the work, but the basic principle still is the same.

The edges of two adjoining pieces are recessed to form a male and female joint. Projecting ridge on the upper part is on the outside, while the corresponding ridge on the lower part is on the inside. The parting line may be straight or may be highly irregular to follow a fold of the garment or other feature of the figure. The outer edge on both parts along the joint line is increased to form a projecting ridge of extra metal. The two parts are fitted together and held in place by a number of rivets with countersunk heads. The projecting ridge then is hammered down flat or until the opening between the two parts is completely filled. Under hammer pressure the metal flows into intimate contact. Excess metal is chipped away and the surface is filed and scraped until all traces of a joint disappear.

In some instances flanges are provided near the joint on the inside. Holes are drilled in these flanges and the parts are joined by bolts. In other instances the figure may be built around a steel frame to which it is bolted in the same manner. The statue of Liberty in New York harbor is an outstanding example of this type of construction. The Hoover dam figures are self supporting. The parts were fitted and riveted and then each joint was arc welded. Joints and all outer parts of each figure were hand chased by

skilled operators. Up to the highest joint *A* on the illustration the metal thickness is 1/2 in. From this point to the upper tip of the wing the metal thickness is approximately 3/8-in.

For many years American art foundries imported French sand for making the molds and cores. This sand from a deposit near Paris possesses certain characteristics which render it particularly suitable for work of this kind. So far as known, up until recently no other sand in the world equals it in this respect. It is refractory and fine grained, carries a natural bond, can be rammed hard, dries in the air like an adobe brick, has a high permeability and has no combustible content. It is perfectly inert, the ideal material for metal to lie against quietly.

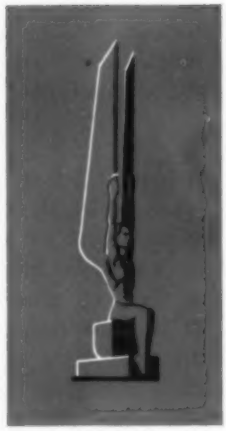
In addition to practically wrecking the normal course of existence all over the world, and proving once again—as if any proof is needed—that those who sit in high places know nothing about keeping the peace, the late war stopped all importation of French sand. However, this did not stop the production of artistic castings. A substitute sand was developed to take the place of the imported variety.

Develop Substitute for French Sand

A prominent supplier of sands and other foundry materials had imported practically all the French sand used in American foundries over a period of 75 years. During World War I the company carried on extensive experimental work with domestic synthetic sands and finally developed a product equal in every way to the French product. However, the cost was too high. Also at the close of the war French sand again was available at about half the price of the synthetic product. The development lay dormant until World War II cut off all foreign supplies. For the last five years art work foundries have been using the prepared sand with perfectly satisfactory results. The accompanying tables show that the physical properties of the two sands are practically alike. Under present existing conditions in France it is stated that the selling price of the domestic product is approximately one half that of the imported material.

Plaster patterns, full size enlargements of the original clay models are used as patterns for castings in the same general class as the ornamental castings for Hoover dam and for the figure of Thomas Jefferson. The following description covers the principal details of this particular method. Descriptions of several other methods of making molds at the Roman Bronze Works will be presented in a future issue. All the methods differ to a considerable extent from those practiced in production or commercial foundries. Through a long and arduous training period the molders develop a high degree of manual skill, speed and dexterity. Speed, of course, is a relative term in a shop where conceivably a man might work for a month on the mold for a 500-lb casting.

Where a plaster pattern is employed the cope flask is laid on its back on the floor and filled with sand. A hollow is scooped in the sand and the pattern is bedded into approximately the correct position with



Fineness Test

Retain on:	French	American
	(Per cent)	
6 mesh	None	None
12	None	None
20	None	0.4
30	None	0.4
40	0.2	0.8
50	0.4	1.0
70	1.8	1.4
100	4.0	3.0
140	5.4	5.6
200	31.6	26.4
270	22.2	21.8
Pan	15.4	19.4
AFA Clay	19.0	19.8

proper reference to the parting line. Sand is tucked under and around the edge and a rough temporary parting is made. No need to be particular, because the cope merely serves as a follow board or offside, and will be shaken out later after it has served its purpose. The drag, which is barred in a similar manner to the cope, then is rammed and the assembly is rolled over. The false cope is removed, a proper parting is made, the cope is replaced, rammed full of sand and lifted off. The pattern is removed from the drag and then the skill of the molder is brought into play.

Out of a miscellaneous collection of steel rods and pipes he constructs a skeleton arbor to support the core. This arbor is fitted directly in the mold which then becomes a corebox and is rammed full of sand. A number of the arbor rods project into the drag where they will serve later as anchors to hold the core in place. The cope is replaced on the drag and

Comparison of Imported and American Sands

	AFA Grain Fineness	Grain Class	Clay Class	Average Fineness	Permeability	Green Shear	Green Compression	Dry Compression
Imported	178	No. 2	F	149	14 with 6.7% water	3.2	12.9	65.7
American	184	No. 2	F	148	18.4 with 6.5% water	3.8	16.7	73.2

sand is rammed in through an opening or openings to complete the core. The entire assembly then is rolled over and the drag is lifted off to expose one half of the core.

Thumb tacks are inserted a few inches apart all over the exposed surface of the core. The tack heads are flush with the sand and serve as guides while the molder with suitable tools removes a thickness of sand corresponding to the desired thickness of metal in the casting. The drag then is replaced, the entire assembly rolled over for the last time and the cope is removed to permit the molder to tack the surface and then remove the casting thickness of sand from the exposed half of the core. During all the manipulation the core remains resting firmly in its appointed place.

In some instances the molds are skin dried with a torch burning oil or gas, but in the majority of instances—especially on large molds—the drag with core in place, and the cope are dried in the oven. At the Roman Bronze Works an electric traveling crane loads and unloads the oven cars. Later the dried mold is removed from the oven and set up on the floor. The parts are bolted or clamped together and the runner basin is adjusted in place. The runner basin is dried and is large enough to hold all the metal required to pour the casting. When the basin is filled from the crane ladle, a plug is pulled and the metal enters the main sprue, from which it is distributed by a great number of small sprues to various parts of the mold.

On exceptionally large molds it may be advisable to provide two pouring basins, one near each end of the cope. This is not so much on account of the total weight of metal, as it is of the area to be covered. For this reason also, large castings are molded and cast in two or more sections and the sections afterward are joined as described previously. The bronze figure of Jefferson recently erected in the Jefferson Memorial rotunda in Washington, is 19 ft high and weighs 5 tons. It was molded and cast in five sections.

(To be concluded next month)

Fig. 7 — Bronze figure of Thomas Jefferson, 19 ft high, mounted in shrine at Washington

Fig. 8 — Figure typifying "Energy" near Superior avenue entrance, Federal Reserve Bank, Cleveland

Figs. 9 and 10—Nude and boy's head

THE Chipping

Fig. 1—Special shape chisel requiring hand grinding

Figs. 2, 3, 4—Various handles for chipping hammers

Figs. 5, 6, 7, 8—Special shapes of chisels for special jobs

CHIPPING is of major importance to the steel foundry industry. It is around this operation that the success or failure of a cleaning room rotates. In discussing this topic, the author will treat, in order, the following components of the operation:

1. The chipping foreman.
2. The chipper.
3. Tools used by the chipper.
4. The chipping operation itself.

Too often insufficient stress is placed upon the selection and training of the chipping foreman. Not only must the chipping foreman be familiar with the many fine points of the labor organizations to which his chippers belong, but he must also know the fine points of chipping. He must know how to do the job himself, how to instruct his chippers, as well as have the ability to foresee and handle the numerous problems, real and imaginary, that occur in the minds of his chippers.

Pause briefly and review a few of the many responsibilities of the chipping foreman. He is responsible for production, both quality and quantity. He must instruct or teach his chippers and supervise them. He must be a safety supervisor. He must be

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Operation

This discussion of the correct type of operator, equipment and practice required for efficient chipping was presented at the second annual Technical and Operating Conference of the Steel Founders' Society of America at Cleveland, June 6

a time-study man to aid in the setting and maintaining of piece work rates. He must be as familiar with the labor contract and plant policies as the stewards and committeemen. Of course, while performing these duties, as well as numerous others, he must gain and maintain the respect of all his chippers.

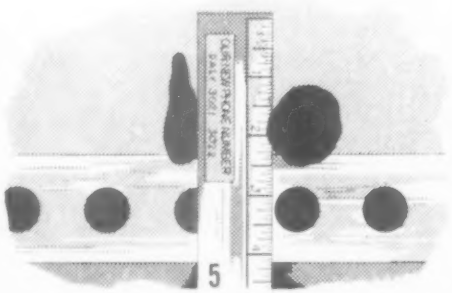
These are just a few of the reasons why it may be said that in too many shops the selecting and training of chipping foremen is treated without sufficient consideration.

Next, let us consider the chipper himself. All statements made regarding chipping refer to the practices at the author's plant. The majority of the chippers, 80 per cent, are piece workers. It has been found that chippers are more productive when an equitable piece-work system can be worked out. This makes the selection of workmen for chipping very important. There seems to be no controversy about chipping being one of the hardest occupations in a steel foundry; therefore, it has been found that it is necessary to select the man with the proper physical qualifications for use as a chipper.

Before a chipper is hired, he must pass a general examination of the eyes, ears, gums, teeth, mouth, throat, blood pressure, spine, blood test and urinalysis. He is examined for varicose conditions, ruptures, hemorrhoids, flat feet (very seldom are normal feet found in the colored race), discharging sinus, spinal column and legs. It is recommended that an x-ray of his chest be taken at least once a year, depending upon the dust condition of the shop. Particular attention should be paid as to whether or not the prospective chipper breathes through his nose or mouth. Breathing through the mouth is believed to be hard on the lungs.

Although there are small men chipping who do as well as the larger men, it is believed that a chipper should weigh at least 160 lbs. The smaller chipper must exert more effort, whereas the larger chipper may use his weight to a better advantage.

This plant has found it necessary to select men who are accustomed to hard work—who are willing to work hard for a good rate of pay. It has been found necessary at all times when the plant is at peak operating capacity, to be continuously breaking in chippers. In this shop these men are called "apprentice chippers." There are many methods of training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chippers. The present method is the one that is believed to be the most effective one for this particular shop. After selecting the proper man, he is brought into the shop and placed under an instructor.

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The instructor in all cases is an experienced chipper. It is preferred to have no more than eight men working under an instructor in the early stages of the apprentice course. In 10 or 12 days of work under the instructor the man will become accustomed to the feel of the hammer, learn something of the tools and start gaining some knowledge of the work to be performed. At this time, the chipper foreman will select the apprentice to be placed with a piece-work chipper.

In teaming together an experienced chipper with the apprentice, the older chipper is allowed to help select the man with whom he wishes to work. If he does not have a particular choice, the foreman will assign the man directly. The entire success of this plan depends on extremely close co-operation between the experienced chipper, the apprentice, and the foreman.

All piece workers in this plant work on a minimum guaranteed wage. Rates are set for each occupation. The apprentice chipper, when coming into this shop, is naturally a day worker, at a rate set in the agreed schedule of wages. While he is in his apprentice course he will never make less than his guaranteed rate, but may, after going to work with a piece worker, earn a higher rate than his minimum guarantee. When the apprentice starts with the piece-work chipper, he is immediately put on the basis of 10 per cent for the apprentice and 90 per cent for the experienced chipper. A graduated scale has been developed in which the apprentice participates at a higher percentage in the piece-work earnings as he gains knowledge and speed.

Regardless of whether a chipper is working with or without an apprentice, the same rate per casting is always maintained. The progression of the participation of the apprentice in the earnings is covered entirely by the total output of the two chippers. When this progression has reached a stage of approximately 40-60 per cent (in favor of the experienced chipper), the apprentice is taken away from the experienced chipper and placed with another apprentice of about his caliber. Normally, these men will be able to earn, on a piece-work basis, wages that will fall in the classification of either the "B" or "C" chipping rates.

Of course, at all times, they still have their minimum guarantee. The elapsed time of making a chipper starting with an apprentice is quite variable due to variations in the aptitude of the student. In this shop the chippers become independent of their guarantee in approximately three to four months. Seldom does a man attain the rating of an "A" chipper under six months and most likely it is nearer the end of a year's service before he has reached this rating.

This scheme of training chippers may seem a little loosely organized to some men. It has been found that where there is a foreman having the proper understanding with his men and the union, that this method is far superior to the many methods that have been previously studied. It is not as simple as it sounds in this brief description. Records will show that no more than 50 per cent of the men used as apprentice chippers ever become productive piece work

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chippers. This is due partially to improper selection, and largely due to the man not understanding the type of work that he has agreed to accept.

Let us consider briefly some of the tools used by the chipper; first, the pneumatic chipping hammer. The author does not care to discuss trade names of hammers, but he can break them down into classifications of valve types, as in Table I, p. 228. The hammers with which the author has had experience are the spool valve, plate valve, and ring valve types. First, let us consider the spool valve, which, until the middle 1930's was the most popular and almost the only type of chipping hammer made by the various manufacturers. This is a very effective hammer, being somewhat heavier than the others, but having a very powerful stroke. The stroke is slower but somewhat stronger than the others. This has its advantages in certain types of work, particularly so where heavy fins or cracking strips are to be removed.

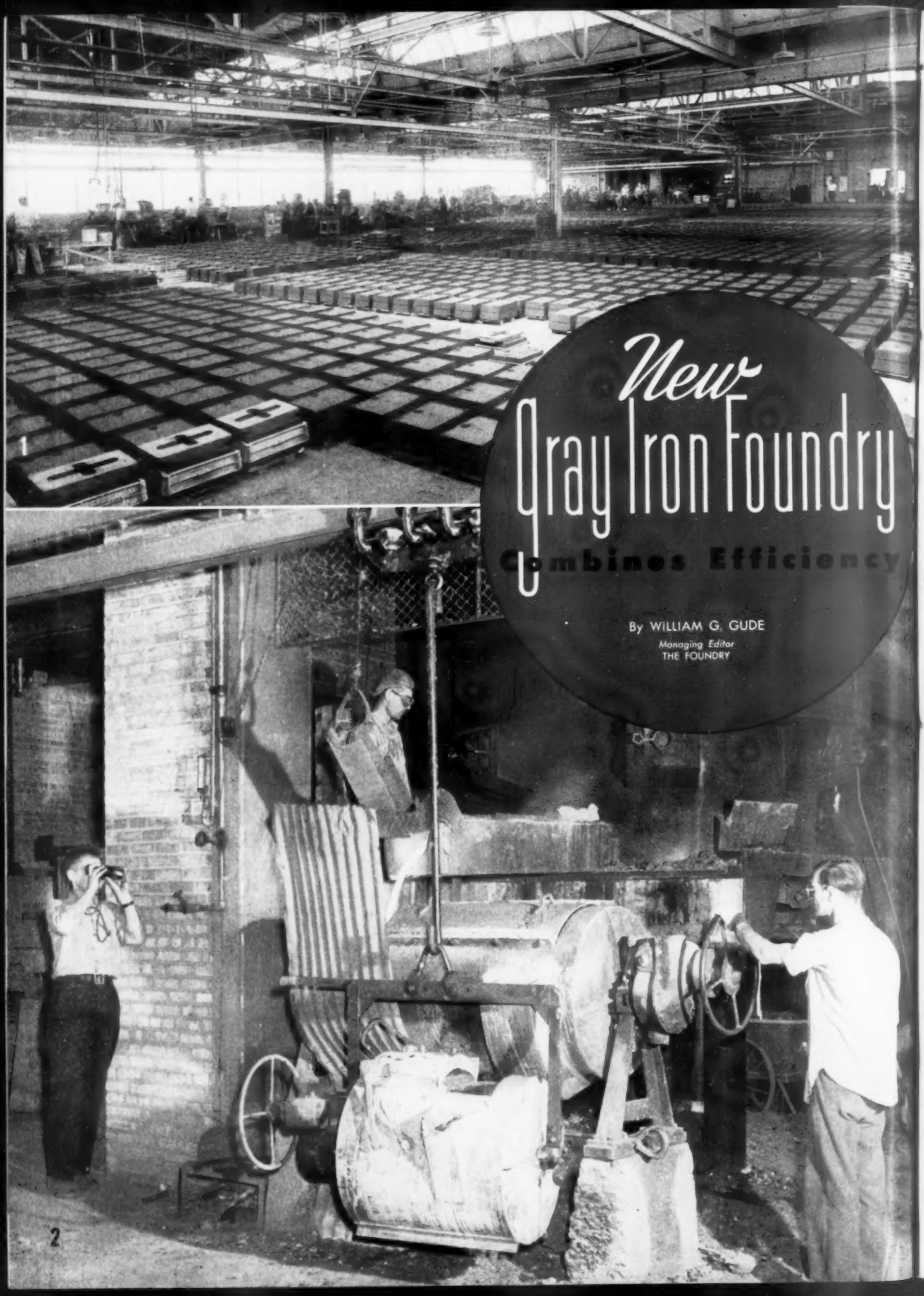
With the plate valve, shorter, faster strokes are used. On medium and light work this hammer is very effective. In this particular shop this type of hammer is being used 100 per cent and it has been found very difficult to get the chippers to even try other hammers.

The ring valve hammer is also lighter than the spool valve type and almost (*Please turn to page* 228)

Fig. 9—Cut produced by chisel ground to 45° included angle

Fig. 10—Proper work height for chipping—28 to 30 in. above floor level

Figs. 11, 12, 13, 14, 15—Various positions which operator is required to assume in chipping



New Gray Iron Foundry Combines Efficiency

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

and Cleanliness

AN interesting example of how efficient, large-volume production of castings can be obtained in a modern, medium-size plant without benefit of complete mechanization of mold and sand handling facilities is afforded by the new gray iron foundry of the Wells Mfg. Co., located in Skokie, Ill., a Chicago suburb. The plant likewise provides a good demonstration of how to incorporate in a foundry the type of working conditions that will compare favorably with those in other fields with which the foundry industry must compete for labor.

Wells Mfg. Co. was formed a short time ago to acquire the business, personnel and facilities of one of Chicago Foundry Co.'s two plants. This was the so-called "B" plant, located in Des Plaines, Ill., which the Chicago company had operated since 1938 and which had specialized in production of valve tappets. Heading the new company are M. K. Wells, president, who formerly was secretary-treasurer of Chicago Foundry Co., and H. W. Johnson, vice president, who also was formerly associated with the latter company. H P. Wenzel is foundry superintendent and J. T. Moore is office manager.

Because of inadequate manufacturing facilities at the Des Plaines plant it was decided to build a new foundry. A 9-acre site was acquired for this purpose in Skokie, and the first heat was poured at the new plant on Mar. 3, 1947.

Approximately a year elapsed between the time the foundation at the new site was started and production was under way. But considering the material and labor shortages which plagued building work during that period, there would have been a still longer delay had not the company resorted to a bit of ingenunity in an attempt to speed up construction. To obtain a railroad siding to the plant the company found it necessary to purchase the rails and hire university students to help lay them during week-ends. Building brick presented another problem. The building contractor's only source of brick was located on Chicago's south side, and the supplier was unwilling to make the long haul north to Skokie. So the Wells company solved this by hauling the brick itself.

Before the plant could be built it was necessary to fill in the ground a depth of 4 feet. Fill earth was obtained a short distance in back of the plant, and the resulting excavation subsequently turned into an artificial pond. This body of water has proved useful not only scenically but also as a repository for the waste material from the foundry. Incidentally, this filling operation had another compensation in that it provided a sizable quantity of high-grade top soil of consequential value on the current market.

Fig. 1—Molding floor of Wells Mfg. Co.'s new foundry is well lighted and spacious. Its 21,600 sq ft contain only four steel columns

Fig. 2—Cupola metal is distributed in 600-lb capacity covered ladles over a monorail system extending in two lines across the molding floor

Fig. 3—Employees' entrance to the foundry is attractively finished in glazed brick

The transfer from the old Des Plaines foundry to the new plant, a distance of 6 miles, was accomplished with a minimum of delay. The former was closed down on a Friday; molding machines and other equipment retained for use at the new site were moved over the week-end, and the first metal was tapped at Skokie on Monday. Practically none of the old employees left the company as a result of the changeover, and about 110 workers now are employed.

Although to all appearances the plant is a complete unit as it now stands, the front of the building, which faces east, eventually will have a 38 x 128-ft addition built onto it to house offices and pattern storage rooms. The area now devoted to offices will become a laboratory. Ample provision also was made in the building plans for expansion of the foundry proper to the rear, should this become necessary.

The accompanying sketch of the plant layout shows the various departments as they now are with future expansion indicated. Width of the U-shaped structure is 283 ft, depth of the wings is 201 ft, and the molding floor measures 120 x 180 ft.

Employees enter the plant through an entrance on the south side of the building convenient to the parking lot. Adjoining this entrance, which is attractively finished in glazed brick, is a 43 x 49-ft area made up of separate locker, shower, toilet and lunch rooms. Gas-fired, fan-ventilated clothes drying cabinets are provided. These rooms, as well as the offices, are equipped with radiant type heating from pipes embedded in the floor. This type of heating is said to be doubly appreciated by the barefooted individual when he leaves his shower on a cold day. The gas-fired boiler which furnishes the heat is independent of the facilities for heating the other departments of the plant. Across the employees' entrance from the locker room is a spotless, well equipped first-aid room.

Maximum use is made of natural lighting in the molding department, one feature of which is that its 21,600 sq ft contain only four steel columns. Roof construction is a combination truss and girder type, which would facilitate installation of overhead sand

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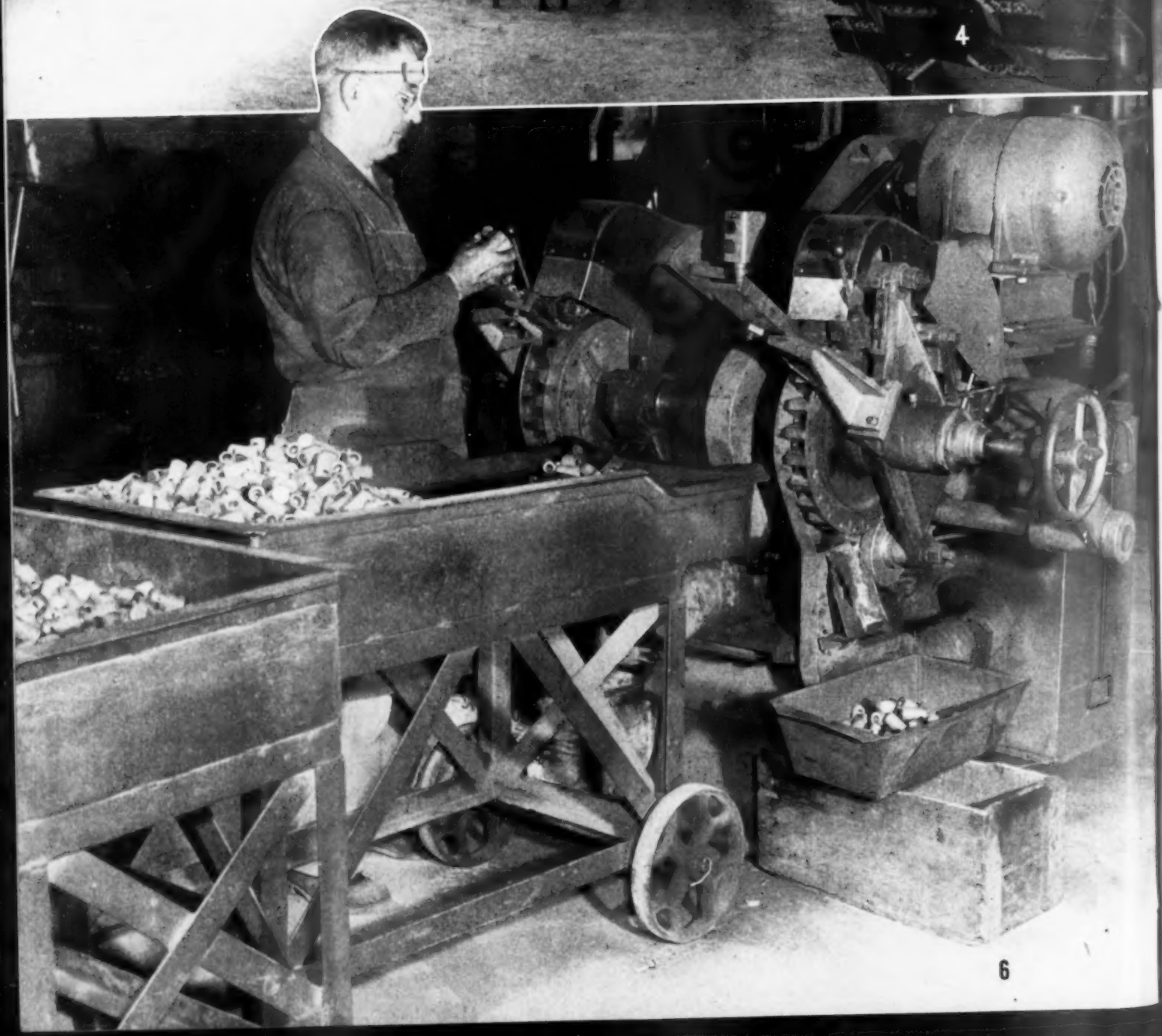

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handling facilities, should this become desirable. Large monitors supplement the effective illumination provided by the high expanse of windows across the west wall. This results in an exceptionally well lighted working area for molding and pouring on most days, with efficient artificial lighting available when needed. Other departments are equally well lighted. One factor that assists in making the most of natural illumination is that the plant site is not in a highly industrialized area and the surrounding atmosphere is normally free from smoke. In fact, the adjoining land still is being farmed.

Space heaters suspended from the ceiling heat the molding area as well as other manufacturing departments. These units are the cone type, steam heated by an oil-fired boiler located next to the coreroom.

The company produces a variety of gray iron castings ranging in weight from an ounce to 15 pounds. In addition to valve tappets for internal combustion engines which comprise a large part of its production, the company also specializes in castings for agricultural equipment, pumps, heating systems and miscellaneous engineering applications. Capacity is approximately 40 tons a day and recently has been averaging close to 30 tons.

Fig. 4—Coreroom with vertical type oven in background. About 90 per cent of all cores are blown

Fig. 5—Good housekeeping marks the cleaning room. Castings are blasted prior to grinding

Fig. 6—Automatic machine especially developed for facing off ends of valve tappet castings

New Gray Iron Foundry

Hot metal is provided by a cupola lined to 54 in. As indicated by the plant layout sketch, space is available for installation of a second cupola beside the existing unit. Pig iron, scrap and coke are unloaded from cars received over the siding parallel to the north side of the plant and stored in bins a short distance from the entrance to the charging room. The latter houses a scale for careful weighing of all charges, and the skip hoist which charges the cupola mechanically. Materials are hauled by scoop truck from the yard to the charging room. One of the five men who operate the cupola is in sole charge of the scale, and all weights of the various components are entered on the heat sheet.

Three 600-lb capacity covered ladles are employed to distribute hot iron to molds for pouring. These are moved by hand over a monorail, which extends in two lines across the molding floor, and the metal then is transferred to pouring ladles. Contents of each of the distributing ladles is checked by a test mold for chill in the case of the high-test iron used in making valve tappets.

Molds are made on 27 portable jolt-squeezer machines. Of this total 18 are devoted to cope and drag work, with 9 molding from matchplates. The former are spaced three to each of the six molding bays extending east and west. Molds, made in snap flasks, are set out on the floor as the machines are moved along the sand windrows. The cope and drag floor occupies

New Gray Iron Foundry

about two-thirds of the entire molding area, match-plate work the remainder.

The universal sand used is a Tennessee grade which provides a permeability of 75 and green compression strength of 6 lb. Moisture content is held around 6½ per cent. Storage facilities for both molding and core sands are located in the raw material yard a short distance from the coreroom. They consist of two concrete silos, 16 ft in diameter and 25 ft high, each of which has a capacity of three carloads. The silos are filled from the top by a conveyor, and sand is removed through a door at the base and trucked to the coreroom and molding department as needed.

Poured molds are shaken out on the floor by the night crew which also breaks off the gates and runners before the castings are dumped into bins and hauled by lift truck to the cleaning room. The used molding sand then is prepared for the next day's operations. This work is performed by a portable sand conditioning unit which is operated in conjunction with a front loading shovel truck. Both the loading and moving of the conditioner are handled by the truck. The unit first screens the sand to remove foreign particles, then passes it through an aerator and throws it into windrows extending the length of the molding bays. Sand is tested for required physical properties at regular intervals.

Silica sand is used for cores and is prepared in a small room adjoining the department where cores are made and baked. A large number of cores are required for the type of castings produced, and about 90 per cent of all the cores made are blown. Cores are baked in a continuous gas-fired oven of the vertical type, the usual cycle being 425°F for 1 1/4 hours. After leaving the cooling chamber, the cores are removed to gravity conveyors. Here they are inspected and placed in metal pans to be stored away until needed by the molding department. The coreroom is effectively ventilated to provide working conditions that are smoke and dust free.

Production of valve tappets calls for something more than the average skill in gray iron foundry practice. While the parts are relatively small, they must be made to close dimensional tolerance and possess high strength—a minimum tensile of 30,000 psi. They are generally cored and require use of chills when poured in order to provide the hard surface at the face of the tappet which is subjected to considerable wear from contact with the engine cam. The tappets are made to a specified face hardness—usually a minimum of 50 Rockwell C—with the chill depth ranging from 1/8 to 3/8-in. depending on requirements, and the remainder of the part of good machinability. Chill depth is regulated closely and involves close control in melting, molding and pouring.

The company produces tappets in a variety of types and sizes, and thousands of chills are required each day in their production. The problem of applying a protective coating to such a large number of chills each day before they are used was solved by an automatic machine developed by the company for this purpose. As rapidly as the bars can be fed into the machine a special process coating is applied uniformly by rollers and the pieces are ejected. The coating is a quick-drying material. Most types of tappets are cast in a horizontal position, an exception being the mushroom type, which is cast vertically.

In the cleaning room castings are put through an airless blast barrel and subsequently ground if necessary. Facing off the ends of valve tappet castings has been simplified by the company's development of a special machine consisting of a disk grinder to which an automatic feed has been adapted. It requires the operator merely to feed the tappets down an inclined chute; the machine does the rest.

The foundry is equipped with a number of heat treating furnaces, these being located adjacent to the cleaning department. The furnaces largely represent equipment employed in a special war contract handled at the old foundry, and only a relatively small portion of the castings now produced are heat treated.

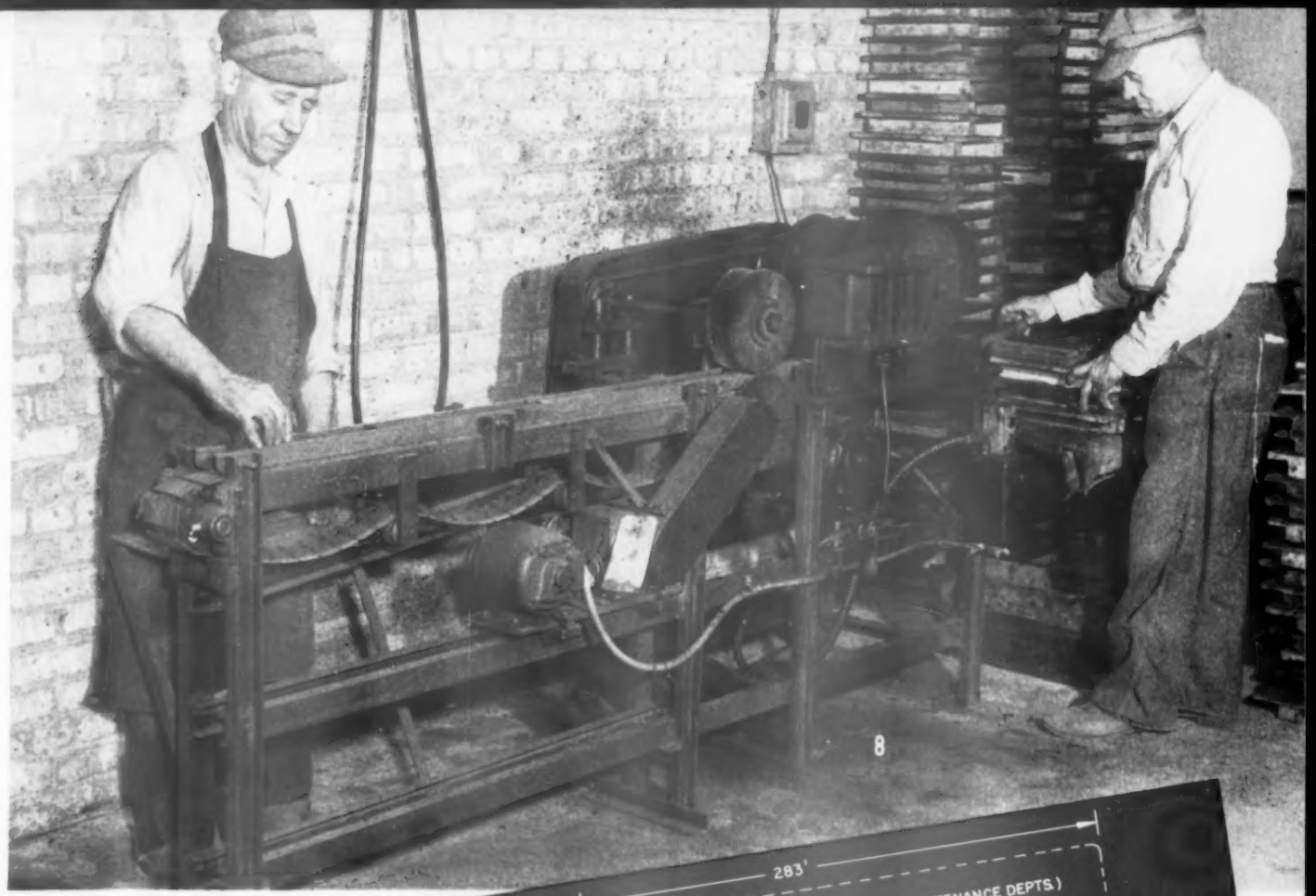
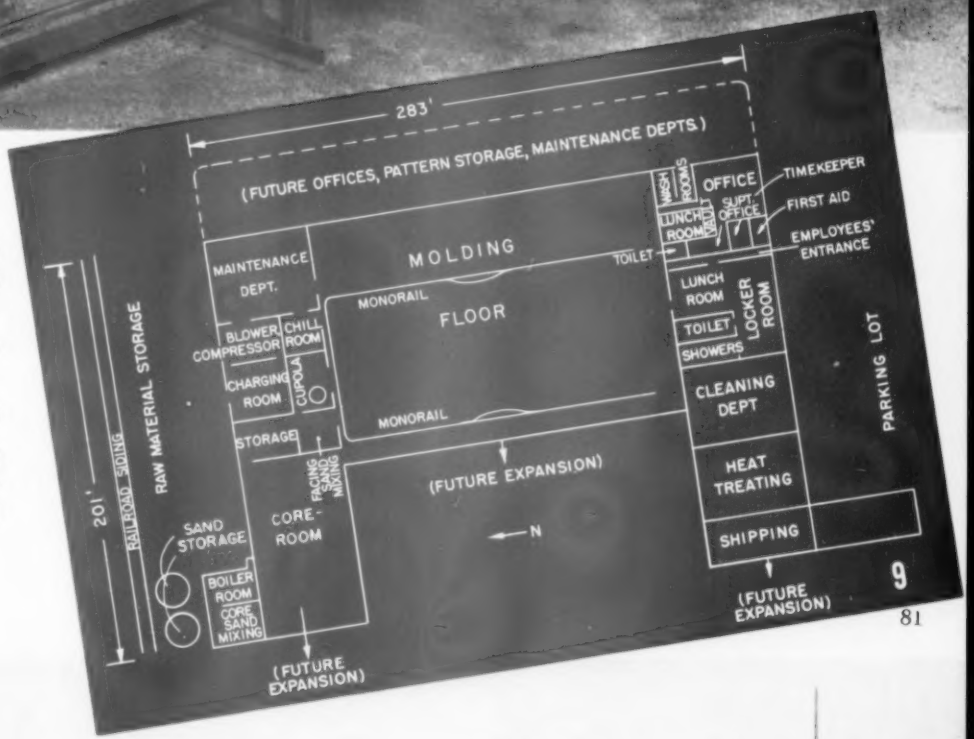


Fig. 7—Locker room and offices are provided with radiant type heating from pipes embedded in the floor

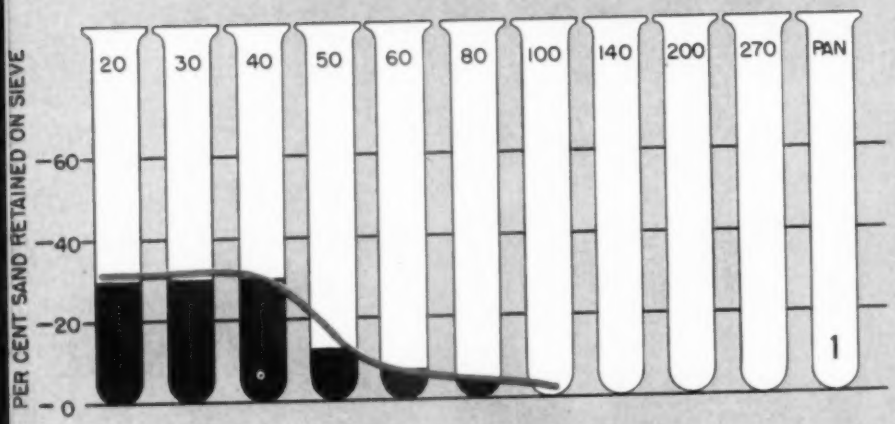
Fig. 8—Bar chills are coated automatically on this special machine

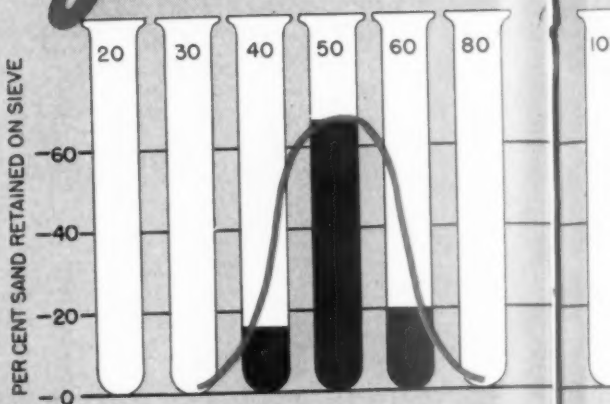
Fig. 9—Sketch of general plant layout

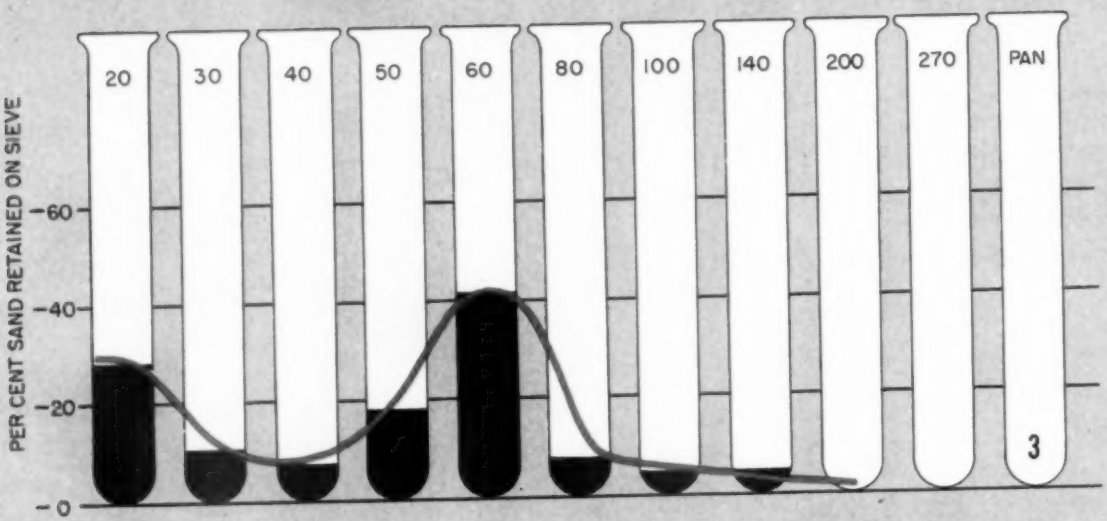
Fig. 10—Architect's drawing of plant incorporating future addition for offices, pattern storage, maintenance department

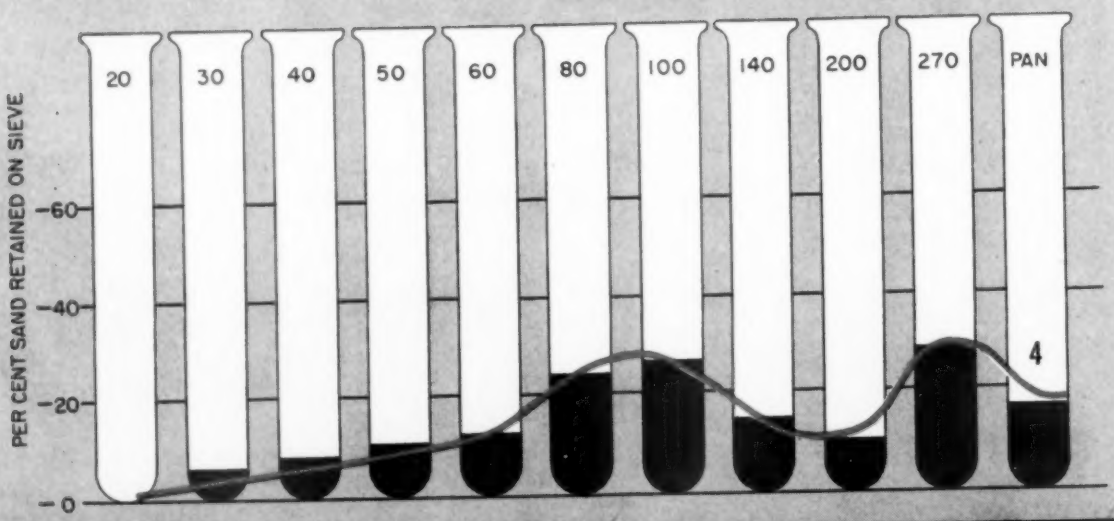


VISUAL ANALYSIS OF Sand Grain









Distribution

By C. A. SANDERS
Engineer
American Colloid Co.
Chicago

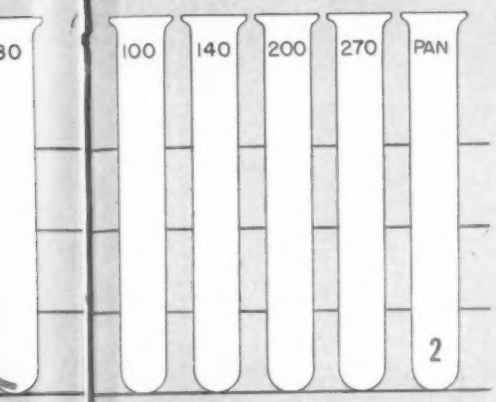


Fig. 1 — This three-screen sand has wide pore spaces and is unsatisfactory for good molding practice

Fig. 2—Three-screen sand with over 60 per cent retained on 50 mesh screen requires additions to control expansion

Fig. 3—Sand of AFA grain fineness 60 to which an "opener" sand was added—lacks fines, is brittle, has poor resilience and toughness

Fig. 4 — Sand with two peaks — 80 to 100 and 270 mesh

—produces bulking effect, soaks up water

CONVINCED of the value of controlling density of molding and core sands, many foundries have adopted the ceramic industry's operation of "grain sizing" or "proportioning of nonplastic aggregate," and are blending various grades of *sand* to obtain desired physical properties. Foundries recognize that sand is responsible for casting finish, as is indicated by the use of facing sands of finer grain than the backing sand, and other additions to the facing sand. However, it has been found that, through proper sand grain distribution, it is possible to obtain suitable surface finish on the castings.

There is a strong tendency toward using molding sands with a grain distribution over five or six adjacent screens, and which are claimed to be more foolproof than the customary three-screen sand. Present progressive methods indicate that it is suitable to blend a core sand with an AFA Fineness Number between 50 to 60 with a finer silica or bank sand with an AFA Fineness Number 90 to 140 in order to control the grain distribution of the sand more properly.

By placing sands retained on various sieves into test tubes one can quickly visualize the screen analysis of any sand. Direct graphs also may be employed for the same purpose. By such procedures sands varying to any degree are easily recognized, and methods are readily devised to overcome any difference in the grain distribution.

Develops Test for Sand Grain Distribution

In 1923 Eugene W. Smith[1], Crane Co., Chicago, recognized the importance of grain distribution by emphasizing the "vibratory test" which he developed. That was more or less a method of determining clay content and grain distribution through a settling test whereby the sample of sand was shaken with water and allowed to stand for a measured period. Don F. Sawtelle,[2] Malleable Iron Fittings Co., Branford, Conn., has used a similar visual analysis for a number of years. For these reasons, combined with ceramic data, the author wishes to stress the importance of sand grain distribution analyses.

Conditions vary in all foundries due to the different grades of sand used and the class of castings produced. Sands and molding material which are combined to manufacture castings must be selected by the individual in charge, and he in turn is guided in his choice by scrap losses and performance of the molding sand under casting conditions.

Changes in the grain distribution of molding sand influence the physical and mechanical properties to a considerable degree. By observing visually the daily distribution changes, either from graphs or test tubes, the foundryman is able to correlate them with the variables in the molding operations. Where several sands are being used in the foundry, the grain distribution is changed easily by introduction of more or less core sand, new molding sand, reclaimed system sand and irregular additions of other materials. Many minor changes are sometimes ignored, but after a few days' operating the grain distribution is changed so radically that improper working conditions or casting defects occur. Prior visual examinations of the distribution curve would direct attention to any change and permit correction before conditions became out of hand.

Jobbing foundries employing several sands on side floors and one mechanized unit for production work occasionally may add weak floor sand to the system and withdraw rebonded sand from the system belt. If floor sand is either left out or added to the system sand, properties will vary considerably. Ordinarily, the foundryman does not recognize the variation in grain distribution until defective castings begin to appear, compelling the application of corrective measures.

As previously mentioned, it is comparatively easy to establish a visual test either by graph or test tube method of the grain distribution for each foundry division making different grades of castings with different sands. With this test, the divisions at all times can observe the varying conditions in the molding sands, and take steps to correct them. Visual tests help to educate lead-men or foremen in the foundry and acquaint them with changes affecting molding conditions.

Grain distribution is extremely important in the operation of continuous sand systems or units where molding sand is handled by machinery. Effectiveness of data collected from visual grain distribution charts can be accomplished only if the entire foundry personnel is acquainted perfectly with the conformation of the standard graph or curve, and what ill effects will result when the curve tends to deviate. Many opinions on sand causing trouble can be disproved if a visual distribution chart is at hand. Use of grain distribution graphs encourages communication between molder and supervisor, and action may be promptly initiated when remedial measures are required.

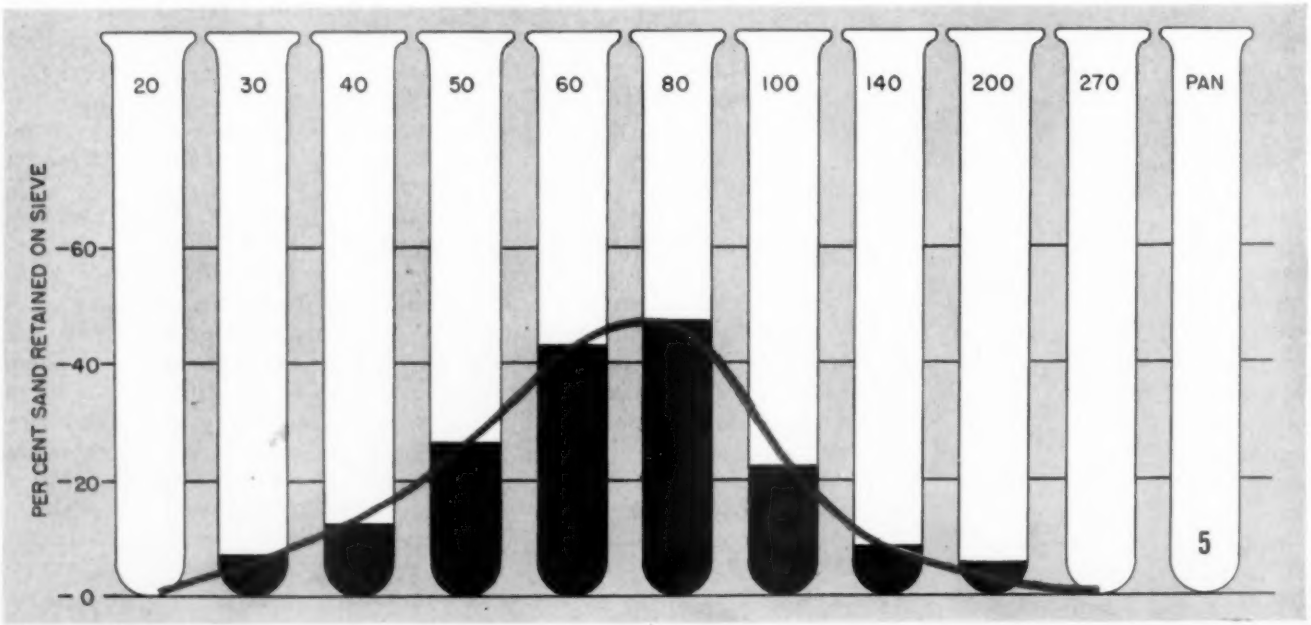
At present it appears that too many ideas relating to sand problems are based on opinion rather than fact, and it is believed strongly that the manner in which sand grains are distributed is the principal factor in daily changes of the properties of sands. Density is controlled by manipulating the grain distribution of foundry sand. Density in turn is related to all the physical properties of sand, including rammability and flowability,[3] and since the physical properties determine whether or not the working qualities of the sand are suitable, the importance of grain distribution can be easily recognized.

Visual examination of molding sands by the test tube method may not supply the answer to what to do when trouble occurs, but it provides a means for correlating the changes in the sand in relation to the sand's workability and casting defects. Coarser impurities or contaminants are quickly recognized by screen analyses, and foundries complaining about rough surfaces and pitted castings have often found that screening may show the presence of iron shot or nonferrous metal balls on the coarser screens. This may be the hidden reason for the rough or pitted surface.

To show various combinations of grain distribution, five visual screen analyses using the test tube method have been selected and are presented here with comments on each. Even if the actual analysis or test each day or week is not of immediate value, the phsychological effect upon everyone concerned is of incalculable value. Each becomes conscious of daily sand variations and will observe casting defects more closely.

Fig. 1 illustrates a sand which easily can result in much penetration due to its wide pore spaces. It can be seen clearly that the sand is a three-adjacent screen sand but is not satisfactory for good molding practice. The sand has unusually high expansion properties and if rammed too hard, scabbing and buckles may develop. Worst defects produced by this sand are metal penetration and burn-in. Many foundries with such a sand believe that it has been fused by the metal, whereas the actual condition is that the sand voids are filled by metal penetra- (*Please turn to page* 216)

Fig. 5—Sand with wide grain distribution is bonded easily and supplies the best overall working conditions



By A. A. CLAY
Comptroller
Ohio Steel Foundry Co.
Lima, O.

Controlling Costs by Production Centers

A method for effective cost control is discussed in this paper presented before Division 5, Steel Founders' Society of America, at Columbus, O.

BUSINESS is conducted in order to make money. The only way to make money is to sell a product for more than it costs. The essential element then is to know the cost.

The small margin of profit existing today in many industries is usually the result of lack of knowledge of many manufacturers of what their products actually cost to produce and to sell.

The steel casting industry is no exception. The lack of knowledge on the part of some steel foundries today of their actual cost of castings *by patterns* causes them to charge unprofitable prices which other foundries are, in many cases, unjustly forced to meet.

Foundrymen in general recognize the importance of accurate and dependable *technical* information in the management of their plants. They will readily admit that the foundry using modern technical and physical methods has a decided advantage. Some are very slow, however, to admit that a foundry can have a similar equal advantage by making use of modern cost finding methods.

A steel foundry may have up-to-the-minute technique and methods but full profits therefrom cannot be assured unless each job is disposed of at a selling price in excess of cost. Therefore, a steel foundry should have a modern cost finding system which in addition to furnishing general cost data can furnish readily (a) the cost of operating each production center, and (b) the cost of castings by patterns.

Although experience has demonstrated that it is dangerous to base selling prices of individual castings on an overall average per ton cost, many steel foundries are still using such a procedure; and, are, of course, getting unsatisfactory results.

Uniform Costing Fundamentals Are Recognized

Progressive steel foundries have adequate cost systems properly functioning. As a result they have the satisfaction of knowing whether or not they are making a profit by each class of jobs they produce; and, if not making a profit, on which jobs they are losing so that corrective measures can be taken. In progressive foundries, uniform fundamentals of cost accounting are recognized and followed with the result that costs are built up in a like manner. A progressive foundry in competing with another progressive foundry has a feeling of satisfaction that it is competing on an equal basis and that it will not be called upon to meet a low price that has been set by guess-work.

The steel casting industry can be thankful that the day of being guided *solely* by the sadly misleading average cost per ton is rapidly passing. Unfortunately, some members are, I am informed, still being guided to a considerable extent, thereby.

In the past, some trade disturbance has been caused by the steel foundry who produced, say, four different classes of work, two of which were sold at a profit and two at a loss, but which classes were sold at a profit and which at a loss were unknown to it. This disregard of costs did much to undermine the foundry's success. The company did not play fairly with its competitors who were better located and equipped to manufacture the castings which unknowingly were sold at a loss.

It is not fair competition to be required to meet a price made upon guess-work, a price that may even be less than the actual cost of production, exclusive of selling and administrative expense.

Accurately kept costs serve another major purpose—they are an index of operating efficiency if maintained properly by *production centers*, because the relative efficiency of the various production centers of a plant can then be watched and compared periodically against past performance and against predetermined standards.

What does a production center constitute?

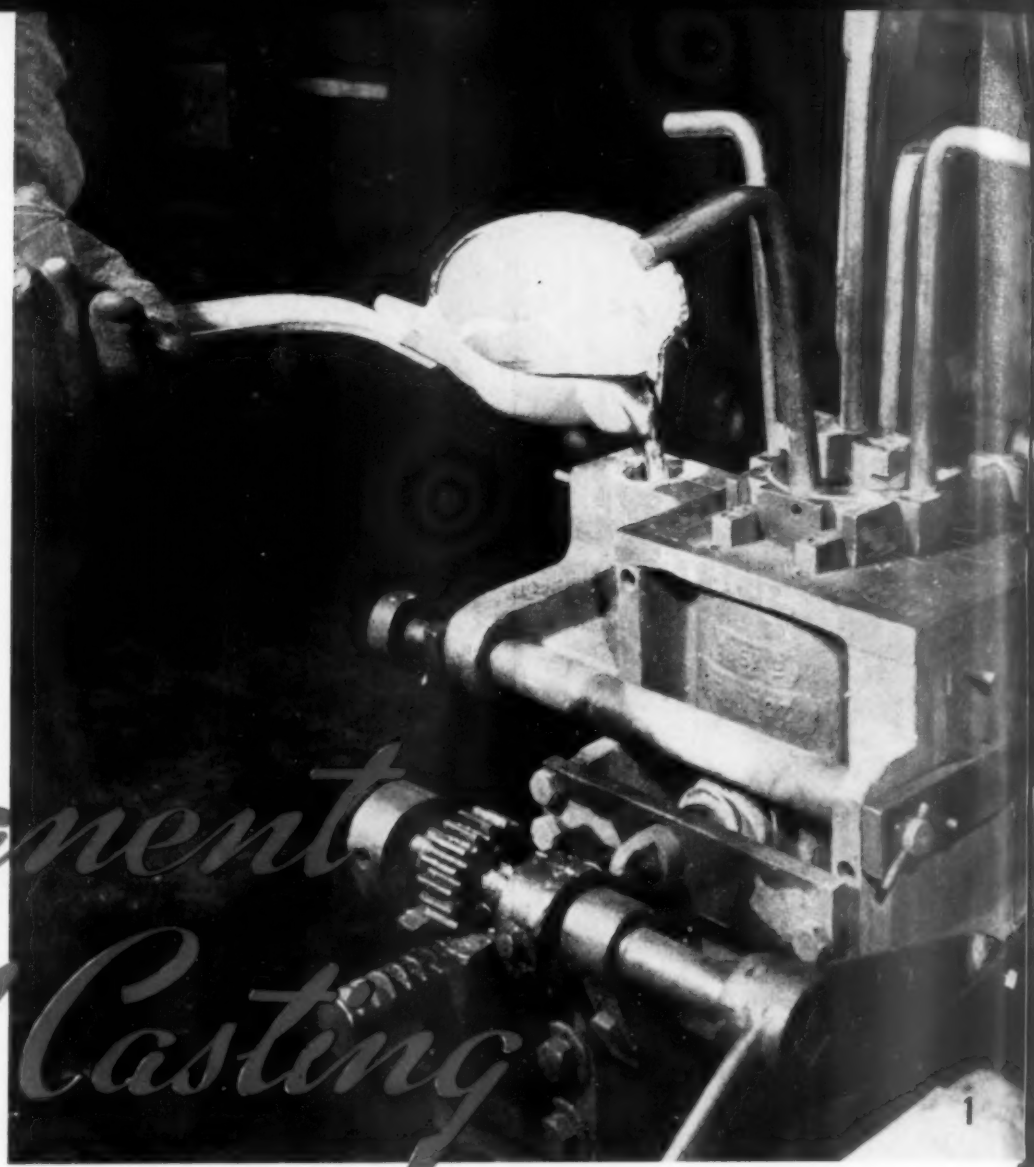
A production center constitutes the total area occupied by like machines or like foundry equipment plus the space necessary for material and tools and for the operators to work with freedom. For instance, a row of grinders in the cleaning room, the squeezer machines in the molding department, etc. A molding department, for example, may be broken down into four production centers, (1) squeezer molding, (2) pin lift molding, (3) floor molding, and (4) pouring and shakeout.

The use of accurately prepared costs by production centers brings to light and directs attention to inefficiencies in (a) management, (b) labor, (c) use of material, (d) methods, and (e) equipment, as well as spot-lighting many other inefficiencies needing attention.

Scoop-shovel costs are dangerous because they are misleading. You eliminate scoop-shoveling to a great extent when you place your cost accounting on a production center basis.

A complete and properly kept cost accounting system furnishing production center costs and enabling the compilation of costs of jobs by patterns will be found to exercise an important production function of lowering costs and hold- (*Please turn to page* 202)

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY



Permanent Mold Casting OF ALUMINUM

ALUMINUM alloy castings produced by the permanent mold process possess certain advantages since they can be made to closer dimensional tolerances, with fine grain structure and higher tensile strengths, than can sand castings. However, the attainment of all those properties necessitates close control of numerous phases, from design and construction of the mold to final treatment of the casting. Those practices, as will be described later, are followed at the Werk road foundry of Aluminum Industries Inc., Cincinnati, manufacturer of aluminum castings sold under the trade name of Permite. This foundry, built in 1941 just before the beginning of the war, is one of today's most modern permanent mold foundries, with a capacity of around 1,500,000 lbs of castings per month.

Production of aluminum alloy castings by the permanent mold process involves consideration of a number of factors, many of which come under the classification of experience. While the metal mold can be made in any desired number of sections to accommodate the contours of the casting, it is desirable to confine them to the minimum. The greater the number of mold sections the higher the mold cost, due to numerous machining operations, etc. also, if those parts move upon one another, they tend to wear and get out of adjustment. Therefore, one of the first considerations is to study a casting drawing or the part and observe whether changes in design will permit simplification of the proposed mold.

For example, undercuts on exterior and interior surfaces should be avoided unless the advantages offset the disadvantages. Undercuts on the exterior usually require slides or movable cores which increase mold costs considerably, while those on the interior commonly involve the use of loose pieces which are withdrawn with the casting, and must be replaced in the mold for subsequent castings. Sharp corners are a source of weakness and should be filleted. Section thickness of the proposed casting should be

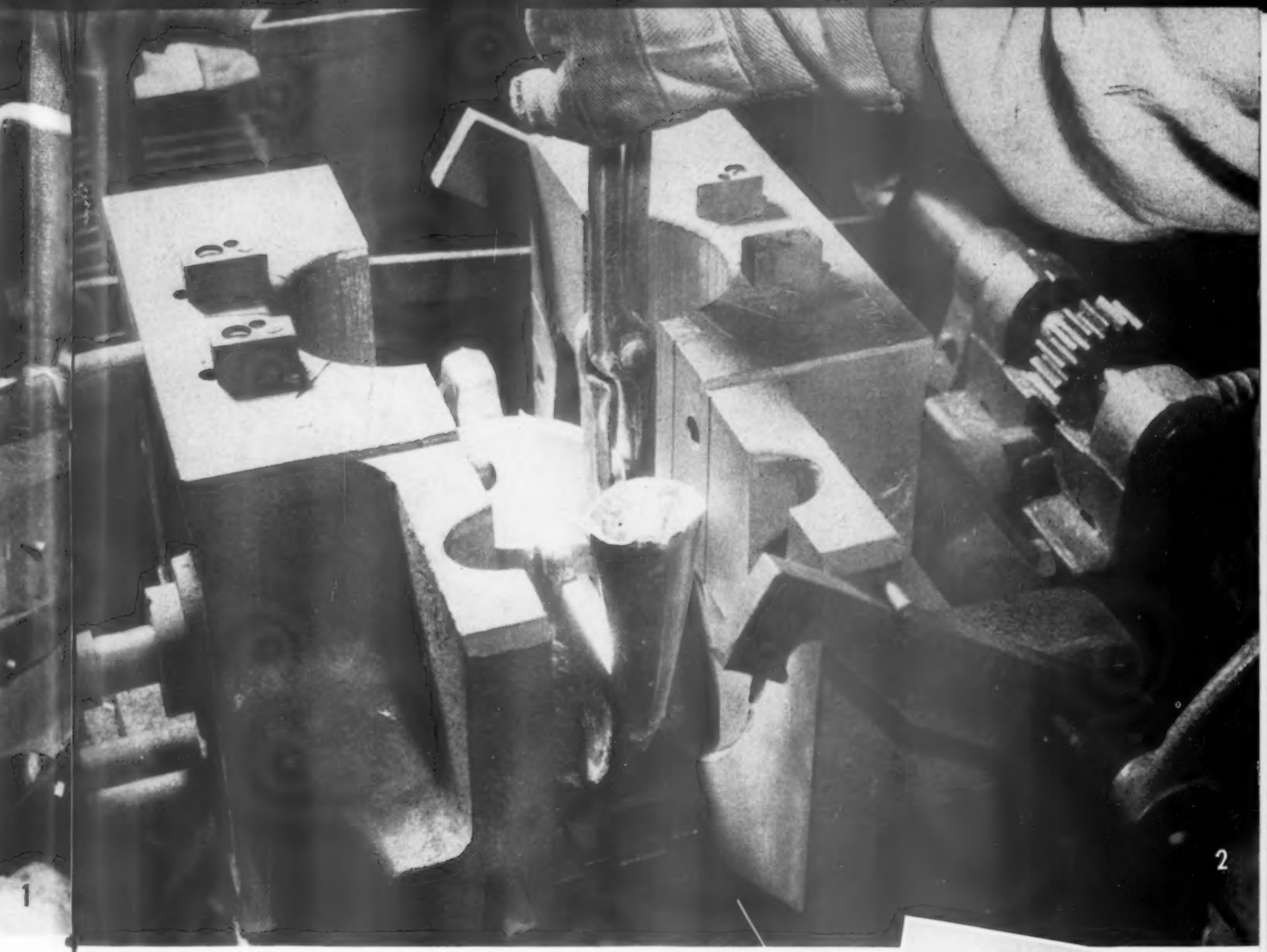


Fig. 1—After the mold is closed and locked, the cores are placed in position and the mold is poured

Fig. 2—Sequence of operations to extract casting is to remove cores, unlock the mold, open it and remove the casting

Fig. 3—Inspecting a large aluminum alloy piston. Note the goose-neck sprue, fan-type slot gate, and the feeder on the opposite side

Fig. 4—Partial view of Aluminum Industries Inc. modern and well equipped laboratory for conducting routine, special and research investigations

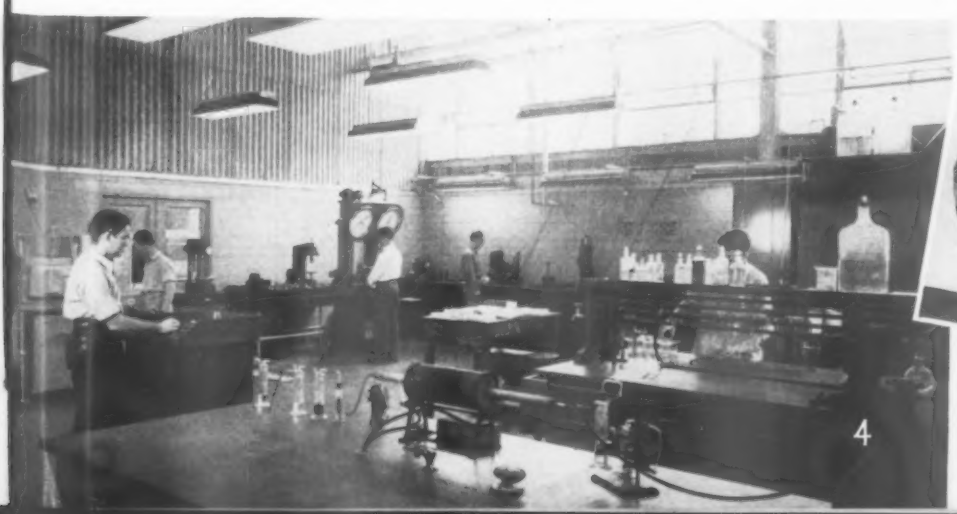


Fig. 5—Several rows of permanent mold casting machines are arranged on each side of the wide central gangway

Fig. 6—Pyrometrically controlled holding pots maintain the aluminum alloy at the proper pouring temperature

Fig. 7—Permanent mold machine is adjacent to a bench on which the castings are cooled. Water box is for metal core cooling

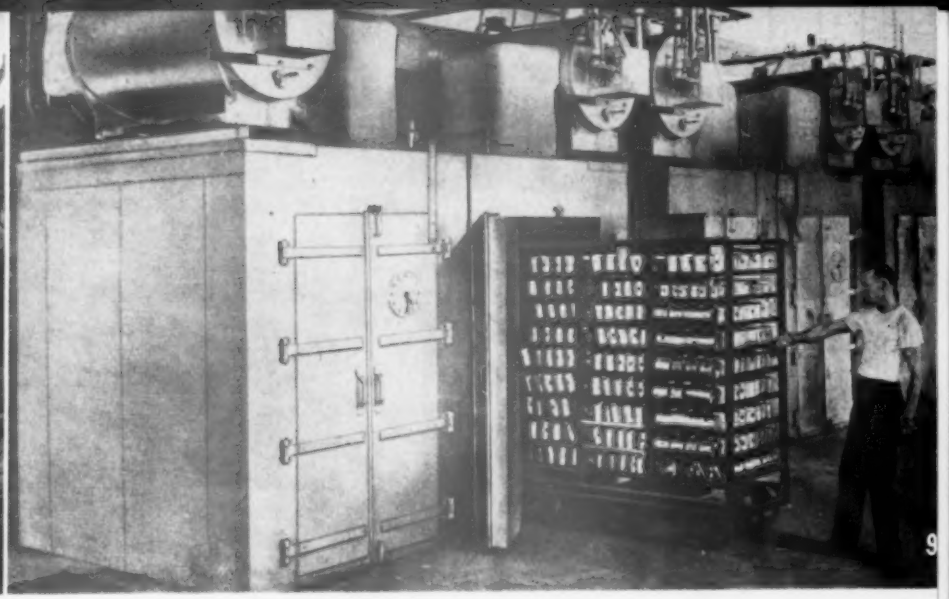


Fig. 8—Gates, risers and feeders are removed from the permanent mold castings on bandsaws, and placed in tote boxes for return to the melting department. Castings are placed in similar tote boxes and sent to the grinding department

Fig. 9—View showing battery of ovens employed in heat treating piston and other castings to develop the desired physical properties

practically uniform, and if that cannot be accomplished, the change from light to heavy should be smooth and gradual. In some cases where the heavier section is employed to provide greater strength and stiffness, the same result can be obtained by substitution of ribs of the same thickness as the lighter section with suitable filleting.

General practice in mold design is to locate the heavier sections of the casting at the parting line so that they may be fed directly from the gates and risers. Where this cannot be accomplished, means must be provided to permit a high cooling rate by such expediencies as applying only a minimum thickness of mold coating, through use of an air blast directed at the specific area, by application of ribs or studs on the mold back to increase surface radiation, employing copper inserts to conduct the heat away more rapidly, or combinations of two or more of these methods. Conversely, at points where thin casting sections are involved and the cooling rate developed by the mold is too rapid, the back of the mold is lagged with asbestos or other insulating medium to decrease the rate of heat conduction. Sometimes additional heat must be supplied to the mold at such points by application of gas burners. As in sand molding the production of sound castings by the permanent mold process is predicated on directional or progressive solidification, which means that the casting freezes or solidifies first at those sections farthest from the gate, and the action then proceeds uniformly and progressively to the gate—the last part to solidify.

Gating of aluminum alloy castings is extremely important since any turbulence caused by spurting, impingement of metal against a core or mold part, or abrupt changes in metal flow, may lead to inclusion of aluminum oxide skin in the casting. Likewise, inspiration of air into the metal stream in the sprue may result in the same trouble. Hence, it is preferable to have the gate located so that the metal flows smoothly without disturbance into the lowest point of the casting. However, this does not preclude the use of top gating since, in some instances, that method is necessary to obtain castings free from shrinks and tears.

Where there is any considerable height between the top of the mold and the gate, the sprue usually is inclined as much as possible in a smooth curve from the vertical to avoid splashing of the metal stream at the bottom. Another procedure employed to provide smooth, nonturbulent flow is to arrange the mold on trunnions so that it may be tilted. At the beginning of pouring the mouth of the sprue is tilted so that it is below the level of the casting cavity. As soon as the sprue is filled the mold gradually is tilted back—maintaining a full sprue—until it assumes the normal position.

A wide variety of gating systems is employed to accomplish nonturbulent flow into the casting cavity. For example, the slot or fan gate which, as implied by the name, involves a comparatively thin connecting channel between casting and sprue from top to bottom may be used. Generally, the slot or fan gate is choked at its point of attachment to the sprue, the thickness being about that of the casting section. From that point the channel is gradually widened to where it is attached to the casting. Thickness at the latter point is as great as possible within limitations imposed by casting thickness and ease of removal. As might be expected, the increase in channel dimension from sprue to casting decreases the rate of metal flow in that direction.

Another gating system which functions similarily to the fan type is the finger gate, which employs a number of equally spaced channels between sprue and casting. It should be (*Please turn to page* 223)

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

Gray Iron

MEET IN 19TH A

DIFFICULTIES presented by the tight stituation in raw material supplies comprised one of the important topics for discussion by the Gray Iron Founders' Society during the organization's 19th annual meeting at Hotel Schroeder, Milwaukee, Oct. 2-3. Another major subject for consideration was the society's new ten-year program for industry improvement based on a comprehensive survey of gray iron foundry problems completed recently by the group's new executive vice president, Raymond L. Collier.

The society's meeting was attended by approximately 275 members and guests and was presided over by its president, Howard A. Stockwell, Barbour-Stockwell Co., Cambridge, Mass. At the election of officers Mr. Stockwell was named to a second term: Ronald E. Kucher, Olympic Foundry Co., Seattle, was re-elected vice president; Edward B. Smith, American Brake Shoe Co., New York, was re-elected secretary, and Henry J. Trenkamp, Ohio Foundry Co., Cleveland, was elected treasurer to succeed Homer Britton, Cleveland Foundry Co., Cleveland.

Directors elected include, in addition to Messrs. Kucher, Stockwell and Trenkamp, the following: J. E. I'Anson, Lincoln Foundry Corp., Los Angeles, Hermann P. Good, Textile Machine Works, Reading, Pa.; Sheldon P. Pufahl, Pufahl Foundry Inc., Minneapolis, and George F. Hutchins II, Standard Foundry Co., Worcester, Mass.

Featuring the concluding session of the meeting was the awarding of illuminated scrolls to seven individuals in recognition of meritorious service to the foundry industry and the Gray Iron Founders' Society covering a period of many years. Recipients were: F. R. Hoadley, president, Farrel-Birmingham Co., Ansonia, Conn.; C. J. Miller, chairman, Fremont Foundry Co., Fremont, O.; H. L. Edinger, president, Barnett Foundry & Machine Co., Irvington, N. J.; E. T. Runge, Cleveland, leader of a number of the society's cost groups; John L. Carter, Newark, N. J., cost accountant for the society; E. B. Sherwin, president, Chicago Hardware Foundry Co., North Chicago, Ill., and C. B. Magrath, president, Greenlee Foundry Co., Chicago. Messrs, Hoadley, Miller, Edinger and Magrath are past presidents of the society.

Program of the opening session consisted of reports by officers and committee chairmen. President Howard A. Stockwell reviewed briefly the important

Outgoing and incoming directors of the Gray Iron Founders' Society at the recent annual meeting. *Left to right, front row*—E. C. Hoenicke, Eaton Mfg. Co., Detroit; J. E. l'Anson, Lincoln Foundry Corp., Los Angeles; R. E. Kucher, Olympic Foundry Co., Seattle; H. A. Stockwell, Barbour Stockwell Co., Cambridge, Mass.; E. B. Smith, American Brake Shoe Co., New York; Homer Britton, Cleveland Foundry Co. *Second row* — H. P. Good, Textile Machine Works, Reading, Pa.; C. T. Milles, C. H. Milles Foundry Co., Chicago; G. F. Hutchins II, Standard Foundry Co., Worcester, Mass.; G. E. Tisdale, Zenith Foundry Co., West Allis, Wis.; J. E. McIntyre, Sibley Machine & Foundry Co., South Bend, Ind. *Third row*—C. B. Magrath, Greenlee Foundry Co., Chicago; H. J. Trenkamp, Ohio Foundry Co., Cleveland; S. D. Russell, Phoenix Iron Works, Oakland, Calif.; C. G. Alten, Alten's Foundry & Machine Works, Lancaster, O. *Fourth row*—J. B. Heisler, A. C. Williams Co., Ravenna, O.; C. B. Shanley, Semi-Steel Castings Co., St. Louis; S. P. Pufahl, Pufahl Foundry Inc., Minneapolis; C. R. McGrail, Texaloy Foundry Co., San Antonio, Tex.; J. O. Jackson, Jackson Industries Inc., Birmingham

n Founders

TH ANNUAL CONVENTION

activities of the society during the preceding 12 months. He also read a telegram received from W. W. Rose, former executive vice president, expressing best wishes for a successful convention. Homer Britton, treasurer, reported on the organization's sound financial condition. Arthur E. Hageboeck, Frank Foundries Corp., Moline, Ill., chairman of the cost committee, discussed the expansion of local cost group activities of the society. He stated that formation of seven new groups in 1946 and four so far in 1947 had brought the nationwide total to 15. However, participating foundries represent less than 15 per cent of the industry, and Mr. Hageboeck urged that more companies affiliate themselves with local groups.

Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O., described progress of the recently established Foundry Educational Foundation, of which the Gray Iron Founders' Society is one of the founding members. The fund-raising campaign to date, he reported, has resulted in pledges of $255,000 from less than 500 companies. One of the indirect benefits resulting from activities of the foundation has been that a number of universities, other than the six schools participating in the program, have become aware of the importance of the foundry industry and have sought advice as to changes in their curriculum which would give more adequate training in foundry and related subjects.

Raymond L. Collier, executive vice president, reported on major activities of the society in recent months. In addition to such subjects as the organization's wage-hour survey, new directory of the society's 565 members, and work with various government agencies, he discussed a newly approved change in by-laws under which the society's membership will be divided geographically into 40 local groups. These groups, in turn, will comprise 12 district groups and in the future will elect one national director from each of the 12 districts. Establishment of these groups will permit independent meetings for consideration of problems peculiar to the particular area.

Mr. Collier also discussed briefly other phases of a broad program which is planned for the future. Initial efforts in this program will be directed toward a sustained trade paper advertising schedule, a balanced technical development program and extensive public relations activity. Copies of the survey-report, in which the society's new program is described, will be distributed to all gray iron foundries in the country.

Outlook for Raw Materials Discussed

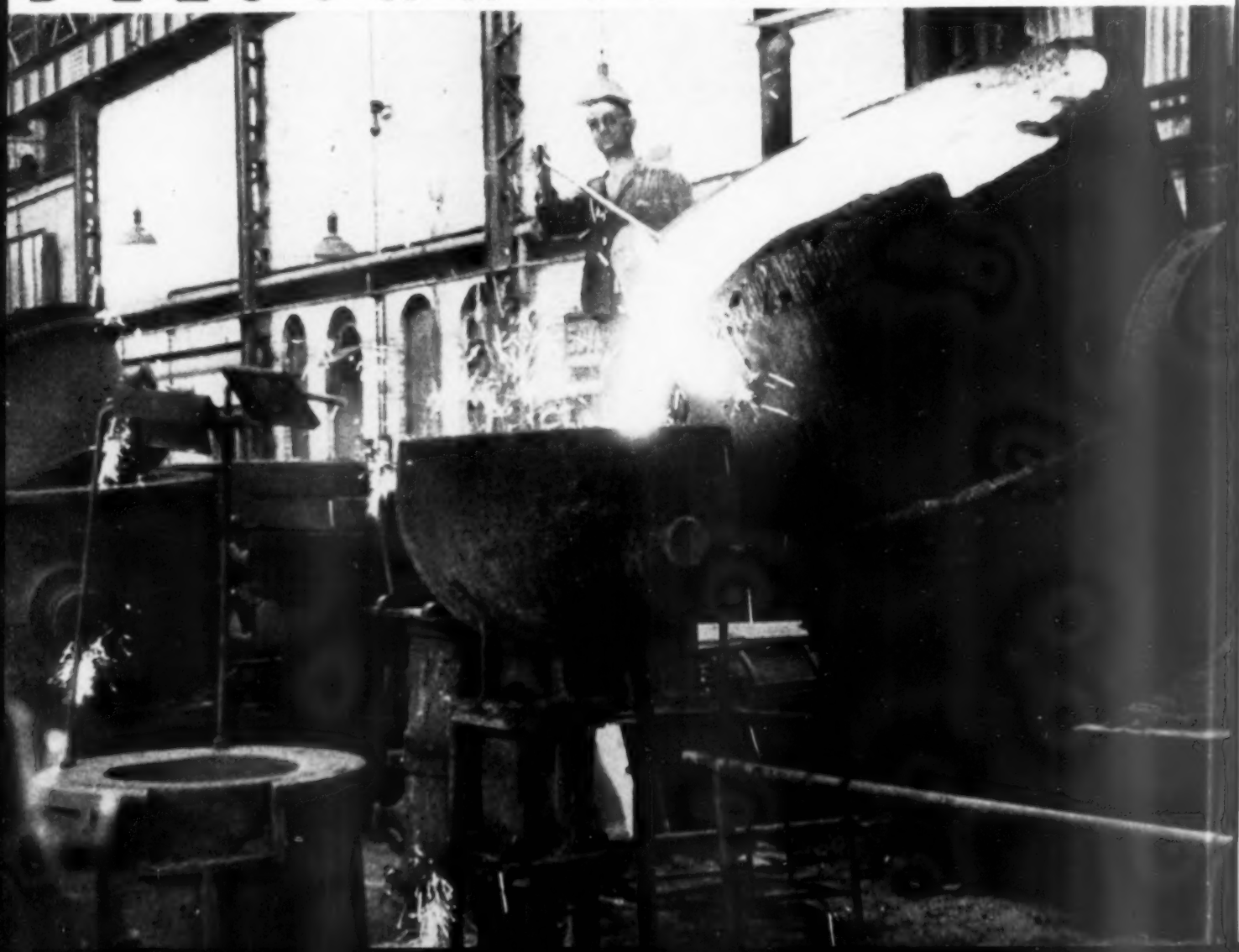
The outlook for foundry pig iron, foundry coke and cast scrap was discussed by three speakers at one of the three business sessions. Speaking on pig iron, B. S. Stephenson, president, Tonawanda Iron Corp., North Tonawanda, N. Y., stated that production of foundry and malleable grades this year has been at the highest rate since 1929, and the increase over 1946 matches the upturn in production of castings. Balance between supply and demand in merchant pig iron may be nearer than is commonly believed, he added, although under existing circumstances there is little likelihood of any additional major increase in production.

Production of foundry and malleable pig iron through July this year was at an annual rate of 5,650,000 tons. This compares with 4,343,000 tons in 1946, an average of 4,360,000 tons in the five years 1941-1945, 3,500,000 in 1936-1940, 2,150,000 in 1931-1935, 6,500,000 in 1926-1930 and 5,800,000 in 1921-1925. Based on average pig iron consumption per ton of castings produced in the past, gray iron foundry operations this year would require an estimated 5,450,000 tons of iron, with malleable iron foundry requirements placed at 450,000 tons. This total of 5,900,000 tons exceeds indicated 1947 production by 250,000 tons or nearly 5 per cent.

During the 20 years ended in 1941 pig iron production capacity was steady at about 56,000,000 tons annually, the speaker stated. New blast furnaces were built during the period but they merely replaced old stacks. Wartime expansion added about 10,000,000 tons to capacity, but practically all of it represented large stacks connected with steelworks and provided little tonnage of foundry iron.

Mr. Stephenson cited various factors which have combined to aggravate (*Please turn to Page* 144)

BELGIAN FOUNDRIES



By VINCENT DELPORT
European Editor
THE FOUNDRY

Top Left — Members of the London branch, Institute of British Foundrymen, at the entrance of the Fonderie Moons, Zelem, Belgium. At right the visitors are shown in front of the residence of Senator Ramaekers, manager of the foundry

Bottom left—Pouring a 9-ton roll at the *Esperance - Longdoz plant, Liege, Belgium*

(Photos courtesy of H. N. Gell, Le Grand Sutcliff-Gell Ltd., Southall, England)

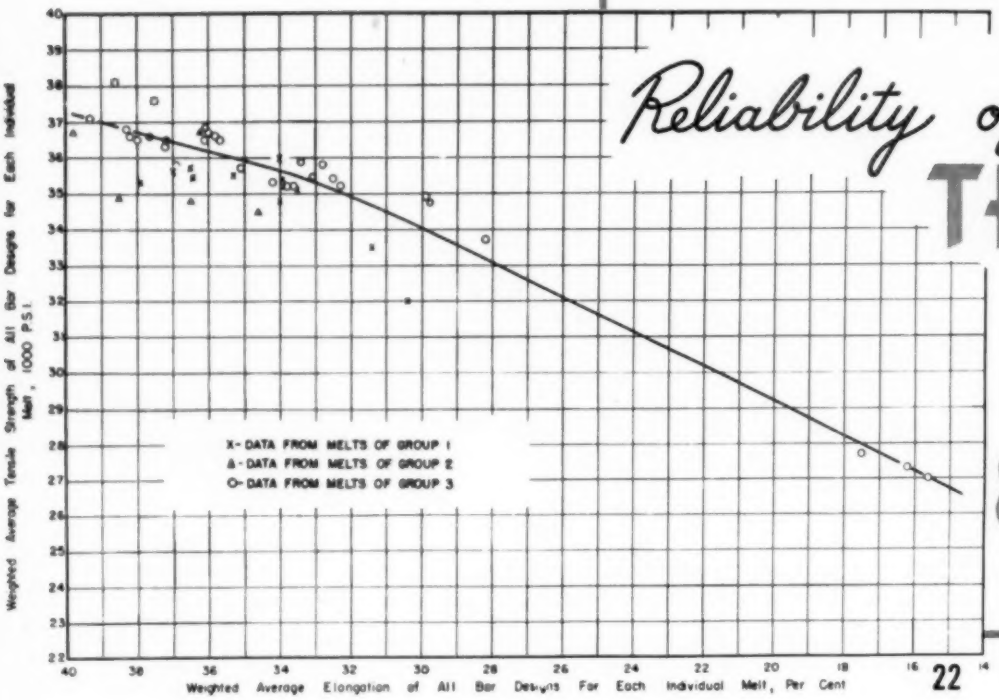
BELGIUM is a country whose foundry industry rests upon centuries of tradition. Rene Deprez, president of the Belgium foundry technical association, in his history of the casting industry in the Liege district, cited by J. H. Viez in his book on ancient guilds of foundrymen, states that as far back as the thirteenth century Liege was a center of manufacture of armor suits. Later, the furnaces used for the making of wrought iron were increased in height, and liquid iron was obtained which, at first, was considered as waste; it was soon found that, cast into molds, this "waste" iron produced castings of various shapes at low cost. In 1627, Ferdinand, prince bishop of Liege, granted a privilege to Octavus de Strada enabling him to substitute coal for charcoal in the smelting of iron ore.

On such historical facts, going back to the middle ages, were laid the foundations of the foundry industry of the Liege district, the principal foundry center of Belgium. Parallel with the development of the trade, guilds of foundry workers came to life, laying down traditions which the craft has maintained to this day. Despite the fact that the territory now comprising Belgium has been used as a battlefield whenever there were wars in northwestern Europe, and despite the two world wars of this century, during which Belgium was under enemy occupation, the Belgian foundry industry has preserved its vitality, and employers and workers alike have retained their traditions and their skill.

Of recent months, visitors to Belgium have returned with reports of a spectacular revival of economic activity in a country which, at the time of the liberation, gave the appearance of being almost bled to death. A recent visit to Brussels and Liege entirely confirms these accounts. Of all countries of western Europe Belgium is the land where almost any goods can be obtained without restrictions, although at comparatively high prices, and where manufacturing industries are rapidly approaching again their prewar activities.

This fortunate state of affairs is not shared to the same extent by Belgium's immediate neighbors, nor by Great Britain, and there are several reasons for this. The war caused relatively little damage to the Belgian industrial works and at the time of liberation the port of Antwerp was almost intact. Despite serious disruption of the transport system, mainly through the loss of locomotives and freight cars, Belgium was able rapidly to start activities and to work for the Allies. She was also able to use to good effect the valuable resources of Belgian Congo, and by these various means achieved a credit balance of reverse lend-lease.

However, hard thinking businessmen and leaders of industry are showing some uneasiness at the present situation, for Belgium has been importing large quantities of consumer goods, a large proportion of which are of a luxury type, and the trade balance is now adverse to Belgium. Moreover Belgium needs considerable capital equipment for the rehabilitation and modernization of her factories, and there is still a relative shortage of coal and man- (*Please turn to Page* 218)


Weighted Average Tensile Strength of All Bar Designs for Each Individual Melt, 1000 P.S.I.
X - DATA FROM MELTS OF GROUP 1
Δ - DATA FROM MELTS OF GROUP 2
O - DATA FROM MELTS OF GROUP 3
Weighted Average Elongation of All Bar Designs For Each Individual Melt, Per Cent
22

Reliability of TEST BAR as a Measure of 85-5-5-5

IN the fourth article of this series, the data showed that of the ten different test bar designs investigated only the following test bars appeared to differentiate between groups of melts having slight differences in melt quality: The Horizontal 5/8-in. web Webbert, the L. T. B., the Navy 5/16-in. web Webbert, the Navy 5/8-in. web Crown.

The design of these and the other test bars have been illustrated elsewhere.[51] Sketches of all four of the above-listed designs are included with the figures presented in this paper. Although the tensile properties of these four test bar designs differentiated between groups of melts having relatively small differences in melt quality or gas content, this differentiation was based on the average tensile properties obtained from the various melts within a group poured from three temperatures. It does not necessarily follow, therefore, that a single bar or even the average of two bars poured from a melt will indicate the melt quality in a reliable fashion even though the test bar practice employed has been standardized.

This article deals with the relationship of the average properties of two test bars of each of the four above-listed designs to the melt quality of each individual heat.

Melts Prepared—A total of 49 melts, weighing approximately 300 lb each, of 85-5-5-5 alloy were prepared. As described in the preceding articles, in order to produce melts of various quality, these melts were prepared in various ways using four different furnaces and two different charging methods. Furthermore, some were prepared without a cover and others were melted under a glass cover. All of the melts were transferred to a preheated pouring ladle, at which time the zinc content was restored and 2 oz of 15 per cent phosphor copper added per 100 lb of melt. These melts were poured into various test bar designs at a high, medium, and low pouring temperature, employing a standard test bar procedure. As indicated in previous articles of this series, the utilization of a standard test bar procedure is very important if the test bar properties are to reflect melt quality rather then variations in test bar practice.

These 49 melts were prepared in three groups:

Group	Number of Melts	Test Bar Designs
1	12	L. T. B. Horizontal 5/8-in. web Webbert Canadian Universal Modified 5/8-in. web Webbert Modified 5/8-in. web Crown
2	5	Horizontal 5/8-in. web Webbert L. T. B. Modified 5/8-in. web Webbert Modified 5/8-in. web Crown
3	32	Horizontal 5/8-in. web Webbert L. T. B. Modified 5/8-in. web Webbert Navy 5/16-in. web Webbert Navy 5/8-in. web Webbert Navy 5/8-in. web Crown

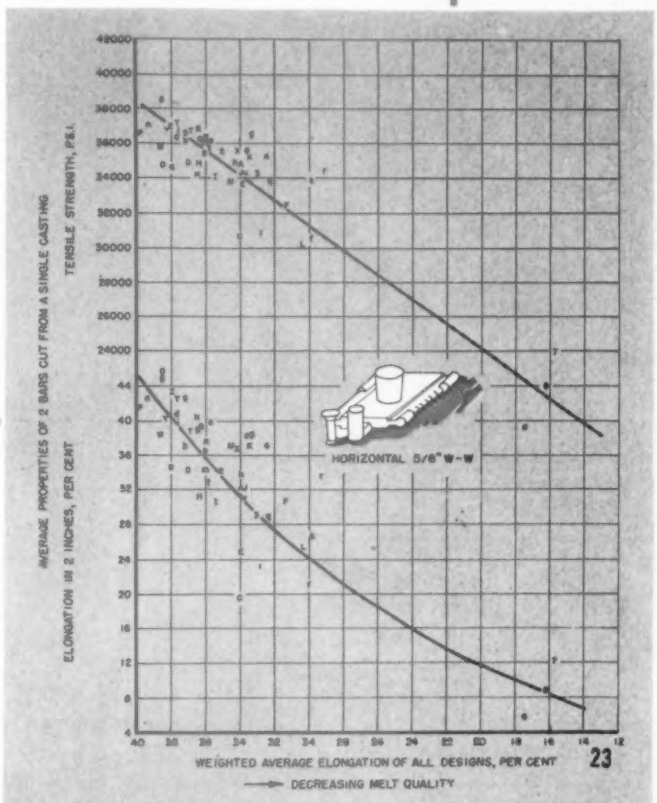
Recommendations on test bar practice for 85-5-5-5 alloy are included in this seventh and concluding article based on investigations sponsored by the Non-Ferrous Ingot Metal Institute

R PROPERTIES

ure of the Quality of

5 ALLOY MELTS

By L. W. EASTWOOD
Supervising Metallurgist
and
J. G. KURA
Research Engineer
Battelle Memorial Institute, Columbus, O.


AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING
TENSILE STRENGTH, P.S.I.
ELONGATION IN 2 INCHES, PER CENT
HORIZONTAL 5/8" W-W
WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT
DECREASING MELT QUALITY
23

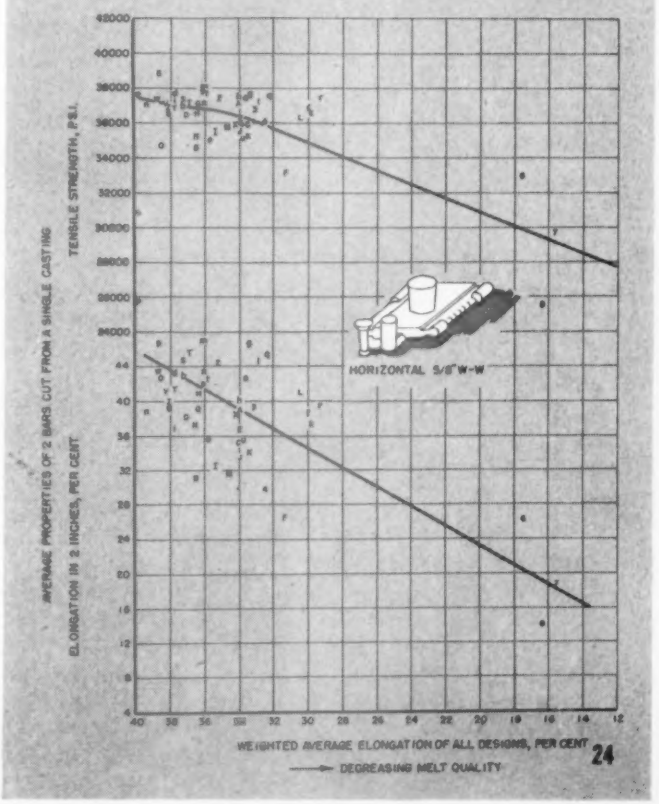

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING
TENSILE STRENGTH, P.S.I.
ELONGATION IN 2 INCHES, PER CENT
HORIZONTAL 5/8" W-W
WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT
DECREASING MELT QUALITY
24

Fig. 22—Relationship between weighted average elongation and weighted average tensile strength of all test bar designs investigated. Tensile properties at the highest pouring temperature were given a weight of 2; those at medium pouring temperatures a weight of 1, and those obtained at the lowest pouring temperature were discarded

Fig. 23—Relationship of tensile properties to melt quality. Horizontal ⅝-in. web Webbert test bar poured from 2225° F

Fig. 24—Relationship of tensile properties to melt quality. Horizontal ⅝-in. web Webbert test bar poured from 2125° F

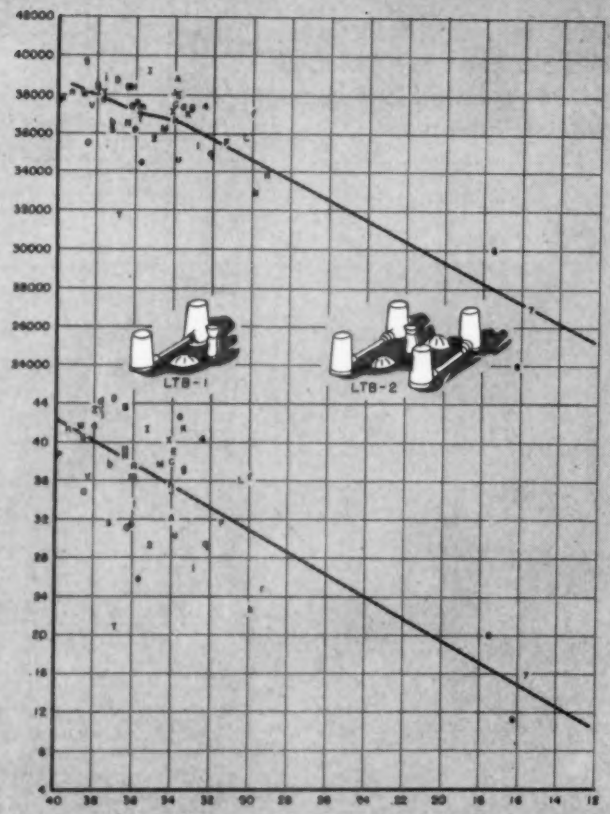
Each of the 49 melts, listed in Table XIII, was poured at a temperature of 2225°F ± 25°, 2125°F ± 25°, and 2025°F ± 25° into natural green sand molds having about 6 per cent water and an AFA permeability of 20 to 40. In view of the adverse effect of the microporosity on tensile properties and the increasing amount of microporosity with increasing gas content of the melt, it is logical that the quality of the various melts can be rated fairly reliably by employing the average tensile properties of all designs of bars poured from a given melt.

Furthermore, since the microporosity produced by the evolution of the gas is more pronounced at the higher pouring temperatures, it is logical that, when rating the melt quality, greater weight should be

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING

TENSILE STRENGTH, P.S.I.

ELONGATION IN 2 INCHES, PER CENT



WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT

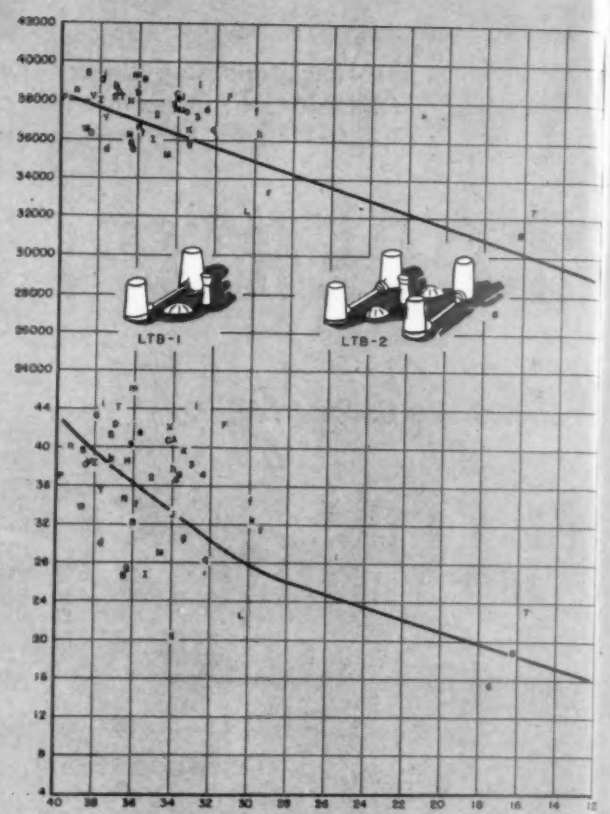
→ DECREASING MELT QUALITY

25

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING

TENSILE STRENGTH, P.S.I.

ELONGATION IN 2 INCHES, PER CENT



WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT

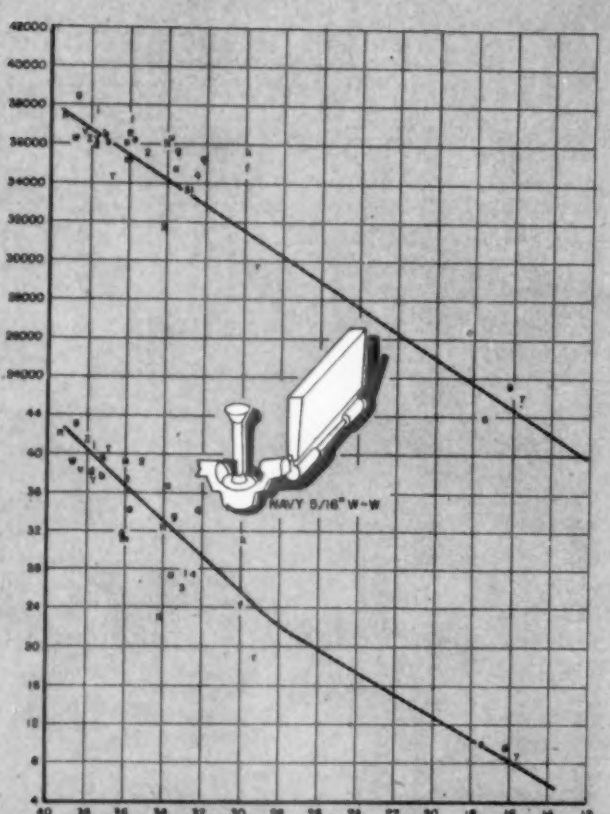
→ DECREASING MELT QUALITY

26

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING

TENSILE STRENGTH, P.S.I.

ELONGATION IN 2 INCHES, PER CENT



WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT

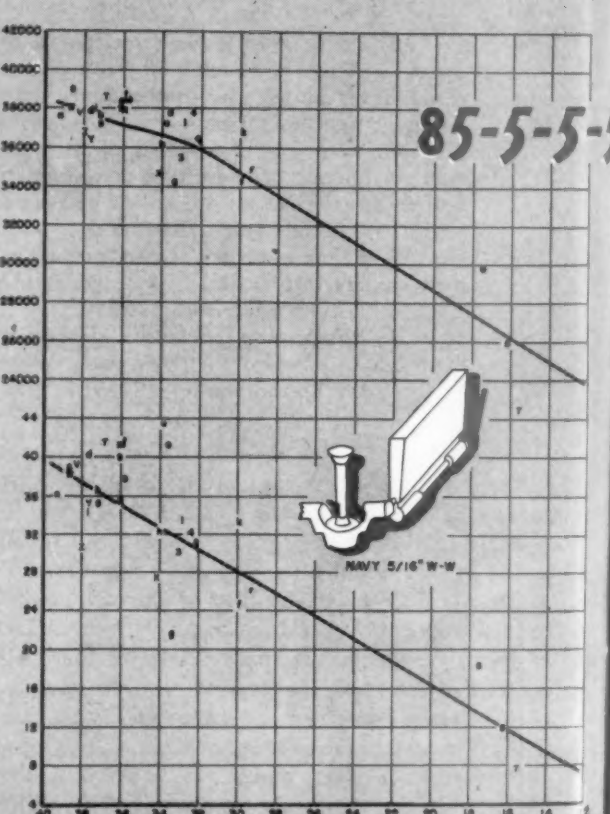
→ DECREASING MELT QUALITY

27

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING

TENSILE STRENGTH, P.S.I.

ELONGATION IN 2 INCHES, PER CENT



WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT

→ DECREASING MELT QUALITY

28

placed upon the tensile data on bars poured at the highest pouring temperature. This was done by arbitrarily giving a weight of 2 to the properties obtained at the highest pouring temperature, and a weight of 1 to those poured at the intermediate pouring temperature, while those poured at the lowest temperature were not used because factors other than the gas content of the melt are predominant in determining the test bar properties obtained at this temperature.

When rating the melt quality by employing the weighted average test bar properties, the elongation values were used principally. However, in general, as the elongation increases, the tensile strength increases also, making a direct relationship. This is illustrated by Fig. 22, which shows the relationship of the weighted average elongation values of all designs to the weighted average tensile strength values of all designs. Consequently, the melts can be rated fairly satisfactorily by employing the weighted average elongation values only. The pouring temperature affects the elongation somewhat differently than it affects the tensile strength obtained; this linear relationship of tensile strength and elongation holds only for a nearly constant pouring temperature.

The melt ratings were made on the basis of the weighted average of four test bars of each design, and they should, therefore, represent fairly reliable criteria for rating melt quality. Thus, the Group 1 melts were rated on the basis of a total of 20 test bars of 5 different designs, those of Group 2 on the basis of a total of 16 test bars of 4 different designs, while those of Group 3 are based on the average of a total of 24 test bars of 6 different designs.

It should also be noted that the same test bars were

ALLOY MELTS

not used for the three groups of melts and, therefore, the ratings based on the weighted average tensile properties are not strictly comparable among the three groups. However, assuming the described method is a reliable means of rating the relative gas content of the melts produced, then the reliability of each individual test bar, as a means of measuring melt quality, can be indicated by plotting the average tensile properties of two bars cut from a specific casting, poured at a specific temperature, against the melt-quality rating based on the weighted average tensile properties of all designs. These plots have been made, and Fig. 23 shows the relationship of the average elongation and tensile strength of the two horizontal 5/8-in. web Webbert test bars cut from the same casting poured at a temperature of 2225° F.

Fig. 24 shows a similar relationship for the same test bar design poured at a temperature of 2125° F. Figs. 25 to 30 show similar sets of curve for the L.T.B. the Navy 5/16-in. web Webbert, and the Navy 5/8-in. web Crown test bars poured from approximately 2225° F and approximately 2125° F. When preparing these charts, the symbol listed in the second column of Table XIII has been used so that each individual heat can be identified on the eight different charts.

It will be observed that all eight charts clearly show that the very poor heats represented by the symbols 6, 7, and 8 are inferior. However, the eight charts do not agree precisely on the identity of the next three lowest melt qualities which, of course, were of considerably higher quality than the lowest three represented by symbols 6, 7, and 8. This is illustrated by the data listed in Table XIV which shows the melts having the fourth, fifth, sixth, seventh and eighth lowest melt qualities as indicated by the eight different charts. It should be again emphasized that all four test bar designs poured at the two different temperatures definitely agree on the identity of the first, second, and third lowest melt quality.

Data for Identification Do Not Agree

As noted in Table XIV, melts designated as A to Q, inclusive, were not poured into the two Navy bar molds. It is quite evident from this table, however, that the data on various test bars employed as a means of identifying the fourth, fifth, sixth, seventh, and eighth lowest melt qualities do not agree.

If, in the charts shown by Figs. 23 to 30, inclusive, individual test bar values had been plotted instead of the average of the two bars cut from a single casting, the scatter would be very much greater than that shown. Certainly, it must be concluded that melts cannot be reliably accepted or rejected on the basis of tensile properties of a single bar. Neither can they be reliably accepted or rejected on the basis of the average properties of two bars cut from the same casting, though the three poor melts, represented on the charts by the symbols 6, 7, and 8, can be clearly identified.

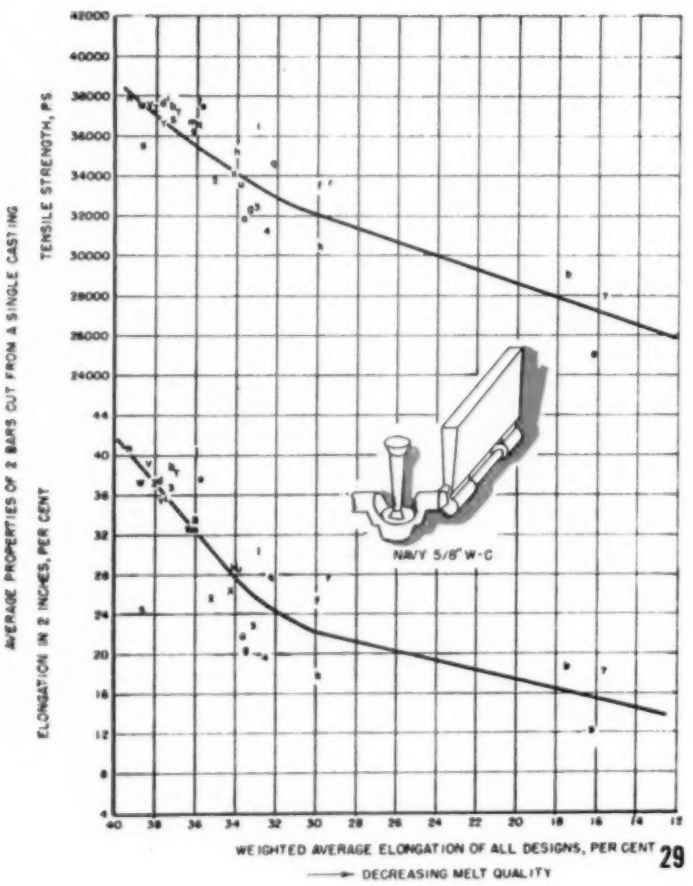
Since there is some indication that at least a small amount of gas is absorbed from green sand molds and a very large amount from dry sand molds baked at 450° F, it is quite possible that the gas absorbed in the mold is the principal uncontrolled variable causing the general insensitivity of the properties of the various test bars to small variations in the gas content of the melts having an intermediate quality. It is evident that if a variable amount of gas absorption does occur in the mold, this would be a serious uncontrolled variable unrelated to the quality of the melt in the pot. It is likely that this possibility warrants careful investigation, and the desirability of using a mold material that is not a source of gas is apparent.

Fig. 25—Relationship of tensile properties to melt quality. LTB test bars poured from 2225° F

Fig. 26—Relationship of tensile properties to melt quality. LTB test bars poured from 2125° F

Fig. 27—Relationship of tensile properties to melt quality. Navy 5/16-in. web Webbert test bar poured from 2225° F

Fig. 28—Relationship of tensile properties to melt quality. Navy 5/16-in. web Webbert test bar poured from 2125° F


AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING
TENSILE STRENGTH, PSI
ELONGATION IN 2 INCHES, PER CENT
NAVY 5/8" W-C
WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT
DECREASING MELT QUALITY
29

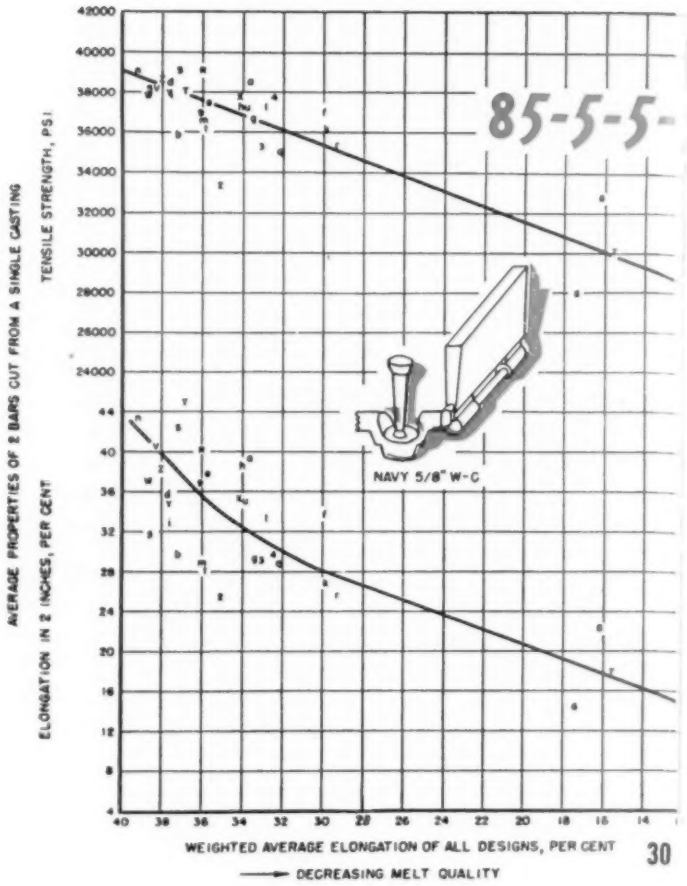

AVERAGE PROPERTIES OF 2 BARS CUT FROM A SINGLE CASTING
TENSILE STRENGTH, PSI
ELONGATION IN 2 INCHES, PER CENT
85-5-5-
NAVY 5/8" W-C
WEIGHTED AVERAGE ELONGATION OF ALL DESIGNS, PER CENT
DECREASING MELT QUALITY
30

TABLE XIII—Average Weighted Tensile Properties of 49 Melts

Heat Number	Mark	Melting* Method	—Weighted Average— Tensile Strength, psi	—Weighted Average— Elongation in 2 in., Per Cent
		GROUP 1		
A 1298	G	$F_1L_2C_1$(T)	35,360	37.9
A 1192	D	$F_1L_1C_2$(T)	35,560	37.0
A 1174	B	$F_1L_1C_2$(T)	35,800	36.5
A 1299	H	$F_1L_2C_2$(T)	35,525	36.4
A 1341	I	$F_1L_2C_1$(T)	35,600	35.3
A 1173	A	$F_1L_1C_1$(T)	35,960	34.0
A 1175	C	$F_1L_1C_1$(T)	34,850	34.0
A 1253	E	$F_1L_2C_2$(T)	35,160	33.9
A 1342	J	$F_2L_2C_1$(T)	35,460	33.9
A 1402	K	$F_2L_2C_1$(T)	35,120	33.5
A 1254	F	$F_2L_2C_2$(T)	33,550	31.4
A 1403	L	$F_2L_2C_2$(T)	32,040	30.4
		GROUP 2		
A 1505	P	$F_1L_1C_2$	36,800	39.8
A 1421	O	$F_1L_1C_2$	34,925	38.5
A 1420	N	$F_1L_1C_1$(T)	34,900	36.5
A 1506	Q	$F_1L_1C_1$	36,900	36.3
A 1419	M	$F_1L_1C_1$	34,520	34.6
		GROUP 3		
A 1660	n	$F_1L_1C_1$(T)	37,120	39.3
A 1642	W	$F_1L_1C_2$	36,690	38.7
A 1693	5	$F_2L_2C_2$	38,130	38.6
A 1641	V	$F_1L_1C_1$	36,870	38.3
A 1648	Z	$F_1L_1C_2$(T)	36,575	38.0
A 1647	Y	$F_1L_1C_1$	36,540	37.7
A 1657	d	$F_1L_1C_2$	36,530	37.7
A 1715	i	$F_1L_2C_1$	37,630	37.6
A 1656	b	$F_1L_1C_1$(T)	36,390	37.2
A 1634	S	$F_1L_1C_2$	36,500	37.2
A 1635	T	$F_1L_1C_2$(T)	35,870	36.9
A 1721	9	$F_1L_1C_1$(T)	36,570	36.1
A 1716	m	$F_1L_2C_2$	36,850	36.1
A 1633	R	$F_1L_1C_1$	36,700	36.0
A 1714	t	$F_2L_2C_2$	36,670	35.8
A 1659	e	$F_1L_1C_2$(T)	36,550	35.7
A 1720	2	$F_2L_2C_2$	35,720	35.1
A 1646	x	$F_2L_2C_2$	35,340	34.2
A 1695	h	$F_1L_2C_1$	36,040	34.1
A 1640	u	$F_2L_2C_1$	35,250	33.8
A 1655	a	$F_2L_2C_1$	35,270	33.6
A 1704	g	$F_1L_2C_1$	35,840	33.4
A 1722	3	$F_2L_2C_2$	36,700	33.1
A 1694	1	$F_1L_2C_2$	35,850	32.8
A 1703	4	$F_2L_2C_2$	35,440	32.5
A 1665	g	$F_2L_2C_2$	35,250	32.3
A 1669	f	$F_2L_2C_1$	34,930	29.9
A 1705	k	$F_1L_2C_2$	34,770	29.8
A 1670	r	$F_2L_2C_2$	33,980	29.3
A 1671	6	$F_1L_2C_1$(G)	27,710	17.5
A 1667	8	$F_1L_2C_1$(G)	27,390	16.2
A 1666	7	$F_1L_2C_1$(G)	27,070	15.6

* F_1 indicates a high-frequency furnace. F_2 indicates a gas-fired tilt furnace equipped with a clay-graphite crucible. F_3 indicates a gas-fired, rocking, barrel-type furnace lined with firebrick.
L_1 indicates a silica lining. L_2 indicates a clay-graphite lining. L_3 indicates a firebrick lining.
(T) indicates that 5 per cent machine turnings was used in the charge.
(G) indicates that a glass cover slag was used when the charge was melted, transferred, and poured.
C_1 indicates that about 40 per cent of the charge, light scrap first, was melted to form a heel and about 10 per cent of the charge was added in six successive additions after the preceding addition had melted. C_2 indicates that the crucible was filled with charge, light scrap first, and as the metal melted, additional charge was added, thereby maintaining a full crucible until the entire charge was melted.

Suggested Changes in Test-Bar Specifications—In view of the almost complete lack of standardization of test bar practices in the various foundries, the reliability of a single test bar value or even the average of two bars cut from the same casting as the basis of acceptance or rejection of melts is even more questionable than that indicated by the data listed here which were obtained by means of a very closely controlled test bar practice. In order to reduce the burden of test bars and to improve their value to all those concerned, the following recommendations on test bar practice for 85-5-5-5 alloy are submitted. These recommendations are not intended to be a complete specification for test bar practice, but rather should be regarded as specific points which probably should be incorporated in a complete specification.

1. Employ a single specific test bar design. The selected pattern should be made on a matchplate and the design of the gates and risers specified. The runners should be fixed on the plate, but the risers and down sprue should be loose and located on the matchplate by means of a pin. The cope and drag should each be 3 in. high.

2. In the absence of a better mold material, employ a natural sand mold having an AFA permeability of 20 to 40 and a moisture content of 6 to 6.5 per cent, with a green compressive strength of 6 to 8 psi. The mold should be rammed by hand or with a machine to a mold hardness of 55 to 60 on the horizontal faces of the mold cavity. A pouring basin, 3 x 2 in. by 1 in. deep, should be formed on the top of the cope. The mold should be placed in a horizontal position, preferably on a suitable level steel frame about 12 in. from the floor.

3. Pour the molds from a height of about 4 in. above the bottom of the pouring cup formed in the green sand on top of the cope. The melt stream should be directed into the pouring cup at the end opposite from the down sprue, and the rate should be sufficient to maintain a full sprue and 1/2 in. of metal in the pouring cup during the entire pour.

4. Fix pouring temperature to within ± 25°.

5. Pour two molds or four bars from the same pot to represent one inspection lot. Average tensile properties of the four sound bars should not be less than a certain minimum value to be selected by the interested parties.

6. Define an inspection lot as the casting poured from 1000 lb of melt. Inspection lots should be increased in weight to perhaps 5000 lb of melt in foundries which demonstrate their ability to produce melts of high quality consistently. In addition, the inspection lot might also be determined in part by the type of castings being poured. Thus, if the use of the castings were such that their failure would not cause inoperation, a still larger inspection lot might be prescribed for such castings.

Summary—Of the ten different test bar designs investigated, work was concentrated on four designs, the Horizontal 5/8-in. web Webbert, the L.T.B.-2, Navy 5/16-in. web Webbert, and Navy 5/8-in. web Crown. All four of these designs clearly identify, on the basis of the average properties of two bars poured from either 2125° or 2225°F, the three melts of lowest quality. None of the designs precisely agrees on the identity of melts of intermediate melt quality. The limitations of the various test bars as criteria for the acceptance or rejection of melts in the foundry have been noted. Recommendations have been made which are designed to reduce the test bar burden in the foundries and to increase the value and reliability of test bars as criteria for the acceptance or rejection of melts.

As shown by the preced- (*Please turn to page* 168)

Fig. 29—Relationship of tensile properties to melt quality. Navy ⅝-in. web Crown test bar poured from 2225° F

Fig. 30—Relationship of tensile properties to melt quality. Navy ⅝-in. web Crown test bar poured from 2125° F

TABLE XIV—Melts of Lowest (4th, 5th, 6th, 7th, 8th) Quality as Determined by Various Criteria‡

Test Bar Design (Criteria)**	Pouring Temperature, ° F.	Lowest Quality as Measured by: Melts of 4th, 5th, 6th, 7th, and 8th Elongation, § Per Cent	Tensile § Strength	Range of Elongation, Per Cent	Range of Tensile Strength, psi
All designs—(weighted average)		r, k, f, L, F	L, F, r, k, f	29.3-31.4	32,040-34,930
Hor. ⅝" web Webbert	2225	G, f*, l, E, L*	L*, f*, c, l, F*	19.5-25.5	30,100-32,400
Ditto	2125	F*, 4, B, M, I	F*, B, o, e†, U†	26.5-32.5	33,000-35,100
L.T.B.	2225	T, k*, r, e, l	T, k*, r*, e, u	21.0-27.0	31,700-34,600
Ditto	2125	E, L*, B, I, Q	L*, r*, M†, Q†, d†	20.2-27.3	32,300-35,500
Navy 5/16" web Webbert	2225	r*, x, f*, 3, l†	r*, x, 3, l, T	18.8-27.3	29,500-34,400
Ditto	2125	g, f*, r*, x, 3†	g, f*, x, r*, 3	21.5-30.1	34,300-35,500
Navy ⅝" web Crown	2225	k*, 4, g, a, 3	k*, 4, a, g, 3	17.7-22.8	30,500-32,400
Ditto	2125	r*, 2, k*, t†, q†	2, a, 3, r*, b†	25.5-28.8	33,400-35,300

† Indicated property not markedly lower than others not listed.
* Low melts according to weighted average properties of all designs.
‡ All nine of the listed criteria agree on the identity of the 1st, 2nd and 3rd lowest quality melts.
** Melts A to Q, inclusive, were not cast into the two Navy bars.
§ See Table XIII for list of heats corresponding to the symbols used in these two columns.

Questions and Answers

Effect of Lead on Gray Iron

Q.—We have purchased some steel scrap containing lead bands which we are going to melt in the cupola for production of gray iron, and would like to know if the lead will have any effect on the iron.

A.—According to an investigation on the effect of various elements on gray iron by Spencer and Walding, *Transactions*, AFA, 1932, lead decreases transverse strength, impact strength, ultimate modulus of elasticity and brinell hardness, and increases the chill. Bolton, *Gray Cast Iron*, states that information available indicates that lead promotes carbide retention to a slight degree with an appreciable lowering of transverse and impact strengths, brinell hardness and rigidity in some cases.

Most recent mention of the effect of lead on gray iron is in a paper by Rose and Lorig (AFA preprint 47-10) entitled "Effect of Copper Addition Contaminants on the Mechanical Properties of Gray Cast Iron" and bears out the preceding statements. All seem to agree that the lead is not soluble in iron except probably to a slight degree, but notwithstanding, it appears to exert a strongly deteriorating effect upon its properties.

Constructing a Small Cupola

Q.—We shall appreciate information on the construction of a small cupola 12 or 14 in. dia. What is the proper fan size, height and number of tuyeres, weight of charges, height of charging door, position of slag hole and any other essential features?

A.—Practically any kind of a casing lined with fire brick may be used for melting iron. For many centuries the Chinese have used light cast iron rings lined with fire clay. Several years ago THE FOUNDRY described a small emergency cupola built of adobe bricks in Mexico. Other instances of small cupolas have been described on many occasions in the pages of THE FOUNDRY. As with construction and method of operation of any type cupola, more attention to detail will be required on a cupola running long heats than on a cupola merely employed in melting a small amount.

A drop bottom is more convenient than a solid bottom but is not a positively essential feature. No slag hole is necessary on short heats. An opening in the shell, 6 x 8 in., in front will serve for a breast and tap hole, and two 3-in. openings on opposite sides 10 in. above the bottom will serve as tuyeres. A *Y* pipe leading to the tuyeres may be connected to any type of fan, bellows or blower capable of delivering about 150 cfm at a pressure of 6 oz. Where the service is available, an air line from a compressor may be tapped.

In congested quarters, or under a low roof, it may be necessary to provide a hood and smokestack, but in any fairly open space this may be omitted. No charging door is necessary, since all the material is dumped in through the open top. Total height from the floor need not exceed 6 ft. Material for the charge first is thrown up on a platform at one side, or entirely surrounding the cupola. Later the operator throws the material into the cupola. The coke bed extends 36 in. above the tuyeres and the charges consist of 15 lb coke and 100 lb iron, broken in small pieces.

Handling of Aluminum Bronze

Q.—We would like to obtain all possible information on the making of aluminum bronze castings including, molding, melting and pouring.

A.—With only a limited amount of space at our disposal, we can touch only briefly on a few of the more important phases of aluminum bronze castings production. Since it is one of the high shrinkage alloys, it is necessary to insure adequate feeding through large risers located over heavy sections, and in event that is difficult, chills must be employed to provide rapid solidification. Aluminum in the bronze tends to cause inclusions of aluminum oxide, and care should be used in designing the gating system so that the metal enters the casting cavity without disturbance or impingement on cores or other obstructions. Castings preferably should be gated at the bottom with the large end of the gate opening into the casting to reduce the speed of flow.

Both green and dry sand molds are used. Sand should have good permeability, and for castings not required for pressure service use of green sand molds is satisfactory, particularly if they are skin dried prior to pouring. For complicated shapes and pressure resistant castings dry sand molds are preferred to eliminate the generation of steam or other mold gases. Adequate venting in both green and dry sand is essential. Cores likewise should have good permeability.

Pouring temperature of aluminum bronze should be as low as possible and still obtain a full-size, sound casting, and will range from 1950 to 2150°F, depending on the thickness of section, intricacy of design, and whether or not chills are used. Melting of aluminum bronze involves the same precautions used with other copper-base alloys in that it should be melted as rapidly as possible under slightly oxidizing conditions and removed from the furnace where it has reached a temperature 50 to 100°F above the desired pouring temperature. This procedure is necessary to keep the absorption of gases at a minimum. Charcoal often is employed as a cover, but it should *not* be placed in the *bottom* of the crucible.

Stirring prior to skimming should be performed carefully to eliminate any possibility of entraining any aluminum oxide inclusions. Hence, a hook-shaped stirrer is used with a pumping motion from the bottom upward so that the surface oxide skin is not broken. Skimming should be sufficient only to remove any debris on the surface. In pouring into the mold the lip of the crucible should be as close to the sprue opening as possible to eliminate splashing, entrainment of air, and to keep the height of pouring at a minimum.

Skin Dry Molds with Gasoline

Q.—We have been informed that in the United States molds are dried with a product spread on the face and then set on fire. This dries the mold very well. We shall greatly appreciate your kindness in forwarding any available information on this phase of foundry practice.

A.—So far as we know the only liquid product used for skin drying molds is gasoline, alcohols also may be used. The practice is not confined to the United States where some molds for light castings are given a slight skin drying, and the practice is by no means universal. In automobile and other production casting plants, the molds for certain castings are sprayed lightly with wet blacking. Then they pass under a battery of natural gas jets which dries the blacking. This is sufficient because the molds are filled with metal almost immediately, before dampness from the backing sand can seep through.

Stopping Iron Flow at Spout

Q.—We are planning on an overhead system for handling molten iron from the cupola in 500-lb ladles, and our problem is a method of stopping the flow of iron from the spout while shifting full and empty ladles. This requires only a few seconds, but the flow must be stopped as a safety measure. We cannot use a mixing ladle or tilting spout because the cupola is not high enough above the floor. Can you give us any suggestions?

A.—We do not know of any arrangement to cut off the flow of iron from the cupola spout without use of some type of a holding and tilting spout or mixing ladle, except botting up. One foundry in your predicament constructed a pit in front of the cupola and installed a mixing ladle. Also a hoisting mechanism was developed which lowers a section of the tramrail containing the pouring or transfer ladle into the pit in front of the mixing ladle. Safety catches prevent movement of the trolley during the operation. When the ladle is filled the whole section is raised to form a continuous track to permit the full ladle to be moved away and an empty one pushed into place for a continuation of the cycle.

You mention that you cannot use a tilting spout due to the low cupola spout, but we wonder if you could not employ one which dips only a few inches either way. Such a spout, about 4 ft long, was installed by a foundry a number of years ago to prevent splashing and dribbling of metal between bull ladle fillings—a situation similar to what you describe. No other dimensions than length were given, but it was mentioned that the spout acted as a holding device when tipped back. It was stated that the spout was pivoted in front of the cupola with a stirrup strap attached to the regular cupola spout to prevent tipping back too far. Actuation was by a small lever. It seems to us that unless the headroom is extremely low that you might use such a device—designing the dimensions of the tilting spout to hold a few hundred pounds of metal if necessary. It could be made 8 in. high at the back, 3 or 4 in. high at the front, and 8 to 12 in. wide. Pivoted about 18 in. from the front end and 4 ft long, such a spout when tilted so that the back is 2 in. lower than in the horizontal position will hold about 275 lb when 8 in. wide and 450 lb when 12 in. wide. Possibly you might be able to employ one of the elongated, barrel-type mixing ladles instead of the usual straight side or slightly tapered shell ladles.

Arrange Inspection Standards

Q.—In an endeavor to set up an inspection system in our foundry department, one of the steps is the formation of standards or specifications covering the requirements of our various customers for surface or visual faults. These specifications immediately will convey to the inspector the requirements of the customer. Can you refer us to any published data, or to any place where a system of this kind has been established and now is in operation?

A.—We regret that we do not know of any definite answer which you can pick up and apply to your present problem. In our estimation you will have a man-size job in training your inspectors. Even after an elaborate course of instruction, a great many close decisions will depend on the inspector's native intelli-

GANGWAY! By J. A. PATTERSON

"Ya' got me—suppose its th' new furnace foreman?"

gence, training, state of mind, general and specific knowledge. Glaring defects, of course, will not merit a second look. Some of the borderline cases are a prolific source of headaches. In the September, 1940, issue, commencing on page 28, THE FOUNDRY presented a paper, *Castings Must Pass Many Tests,* prepared by M. D. Johnson. The paper does not supply a complete and detailed answer to your problem, but may serve as a foundation on which to erect your own solution.

Has Difficulty with Chillers

Q.—We would like some information on casting chilled car wheels. We are having trouble with making suitable chills. These were made of ordinary cast iron and cracked. Can you suggest anything on design of the chills, and can ordinary cast iron be used for them?

A.—If by ordinary cast iron for the car wheel chillers you mean those without appreciable alloy addition, the answer is yes, although the addition of small amounts of carbide stabilizers such as chromium and vanadium undoubtedly would increase resistance to heat. However, if by ordinary cast iron you mean one which would be used for castings 1 in. thick, the answer is no because, in a comparatively heavy section (4 or 5 in.) of a chiller, the silicon will be too high and the structure too open. Our suggestion would be to use the same material for the chillers as is used for the wheels made in them. In this country the silicon in car wheels is around 0.60 per cent, and we suggest that you try that. If machining proves too difficult, increase the silicon content slightly.

Making Iron Grinding Balls

Q.—Can you give us any information on who makes cast iron molds for the production of hard iron grinding balls?

A.—From articles which have appeared at various times in the technical press, we have gathered the general impression that in many instances the only molds employed for the purpose have been developed and constructed by companies engaged in the production and subsequent use of hard iron grinding balls. In the most elaborate installation of this kind, described in THE FOUNDRY several years ago, a battery of molds set up in a double row has a capacity of 20 tons of balls per day. Each unit in the battery is made up of two large slabs of cast iron corresponding to the two halves of an ordinary sand mold. Instead of being mounted one on top of the other in the usual horizontal position, the two slabs, facing each other, are set up vertically. One half is stationary, while the other half is moved backward and forward by a hydraulic or pneumatic plunger. The mold cavities are arranged in a double row with a central runner and suitable gates in the opposing faces of two slabs. After the castings have solidified, the mold is opened and the balls fall on to a conveyor which discharges them into a railroad car. In smaller installations the same general design prevails with the exception that the molds are operated by hand. If the castings are poured with a high head and through a small runner, they will show no sign of shrinkage on top. Since extreme hardness and toughness is the main requisite, the ball castings may be poured from any available mixture of white iron.

Method To Store Matchplates

Q.—We have approximately 1500 aluminum matchplates and wish to rack them on edge so that they will be readily accessible and easily distinguished. We shall appreciate any information, sketches or illustrations on this subject.

A.—On several occasions THE FOUNDRY has presented articles on pattern storage systems. Most of these are general in character and deal largely with wood patterns. All systems are basically similar in that the patterns are numbered according to any convenient method of grouping. Aisles and shelves in the pattern storage building are numbered and lettered according to a definite plan. A card index in the pattern shop office indicates the position of a pattern at any time.

The pattern storage racks in a modern Pennsylvania foundry, described and illustrated in the August, 1940, issue of THE FOUNDRY, would meet your requirements. One of the advantages is that while, if necessary, it may be fabricated by outside iron workers, it is not beyond the capacity of handy members of the shop crew. The materials include a number of 12-ft lengths of angle iron, and several 6-ft lengths to serve as posts or uprights. The horizontal bars are attached to the uprights by welding, bolting or riveting. One horizontal bar is attached to the posts about 2 ft above the floor. A second bar is attached 2 ft above the first. The third bar is attached to the top of the two posts. A row of holes 1/2 in. dia and about 6 in. apart is punched in the flat face of the angle iron.

Hook bolts or S-hooks are suspended from the holes. The match plates are suspended from the hooks by the pin holes. As many units as may be required are erected on the floor, with narrow gangways or aisles between. Other articles of interest on pattern storage and pattern records include "Pattern Vaults Require Planning" in the September, 1946, issue and "Pattern Records" in the October, 1946, issue of THE FOUNDRY.

Thin Castings Need Hot Metal

Q.—We shall appreciate information on the most free running brass for casting very thin emblems.

A.—Recommended analysis for thin ornamental brass castings shows copper 81, tin 3, lead 7 and zinc 9 per cent. However, it may be pertinent to point out that the temperature at which the metal is poured is a more important factor than the composition. In this particular instance, where practically no physical properties are involved, the analysis may vary to a wide extent and still produce satisfactory castings. In fact, these castings usually are made from a miscellaneous scrap charge. For very thin castings the metal is poured at a temperature up to 2300°F. One or two oz of aluminum added to the metal in the pot increases the fluidity.

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MEN of Industry

WILLIAM E. BUTTS, vice president, General Metals Corp., Oakland Iron, Steel and Malleable Division, Oakland, Calif., has been elected president, Enterprise Engine & Foundry Co., San Francisco. In addition to retaining his position in General Metals' operation, Mr. Butts also will direct Enterprise's activities in the diesel engine, oil burner and food processing machinery fields. Mr. Butts' experience in the foundry business dates back to 1928 when he joined General Metals Corp. in the Los Angeles Malleable Division. In 1936 he was transferred to the Oakland Division as vice president in charge of operations. He has been active in the American Foundrymen's Association and in the American Society for Metals.

* * *

A. M. Cadman, who was elected president of the Pittsburgh Foundrymen's Association for 1947-48, has been with the A. W. Cadman Mfg. Co., Pittsburgh, of which he is president, for the last 40 years and prior to that he was employed by the Mellon National Bank. He is a director of the Tristate Industrial Association Inc., Pittsburgh; director of the Non-Ferrous Founders' Society since its formation; sustaining member of the American Foundrymen's Association; and was vice president of the Pittsburgh Foundrymen's Association last year. In the preceding years he was chairman of the association's non-ferrous technical committee and was also on the executive committee.

* * *

William B. Ziegelmueller, recently elected chairman of the Central Indiana Chapter of the American Foundrymen's Association, has been vice president and general manager of Electric Steel Castings Co., Indianapolis, since 1944. Mr. Ziegelmueller, a native of Indianapolis, attended night school there and joined the trucking department of Electric Steel Castings Co. in 1923. Two years later he was transferred to foundry work, becoming foundry foreman in 1935 and foundry superintendent the following year. In 1942, he was made a director and vice president of the company, becoming vice president and general manager two years later. Mr. Ziegelmueller served the Indiana Chapter as vice chairman last year.

* * *

Roy C. Hobson has been made assistant to the vice president in charge of sales for National Malleable & Steel Castings Co., Cleveland. Since 1945, Mr. Hobson has been assistant sales manager of the company's Chicago works. A native of Maine, he received his engineering degree from the University of Maine, and started with the company in 1928 in the road service division of the railway sales department. Two years later he was transferred to the specialty development department and in 1938 was appointed chief inspector at the Sharon plant. In 1944, still at Sharon, he was assigned to engineering work on company products, and held that post until joining the Chicago works sales department.

* * *

J. L. Petresky has been appointed assistant to the president, National Bronze & Aluminum Foundry Co., Cleveland. Mr. Petresky, who has spent 45 years in the foundry industry, has been with National Bronze for the last 25 years. **William F. Muth,** one of the original organizers of National Bronze & Aluminum Foundry Co. in 1911, has been made sales administrator. **J. B. Rearick** has been appointed comptroller, and **A. J. Mosley** has been made chief engineer. **William K. Southgate** remains assistant to the president in charge of new processes.

* * *

William R. Slattery, who for the last 10 years has been engineer on plant layout and design for the Plymouth Division, Chrysler Corp., Detroit, has been appointed chief engineer of the Robinson Clay Product Co., Akron, O. Mr. Slattery is a graduate of Lawrence Institute of Technology. With headquarters in Akron, he will have charge of engineering for the Robinson company's plants in Ohio and Pennsylvania.

* * *

W. D. Moore and **Charles Wegelin,** both of Birmingham, have associated themselves as an agency to assist consumers in the procurement of castings. Their service includes the locating of a suitable source of sup-

(*Continued on page* 106)

WILLIAM E. BUTTS

A. M. CADMAN

WILLIAM B. ZIEGELMUELLER

ROY C. HOBSON

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

General Sales Offices

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(*Continued from page* 104)

ply, expediting of orders placed and inspection of castings before shipment. Both men have had long experience in the foundry industry. Mr. Moore retired last year from the American Cast Iron Pipe Co. after serving as its president for 22 years, while Mr. Wegelin formerly was president and treasurer of the Dixie Bronze Co.

♦ ♦ ♦

Edward M. Paullin, formerly assistant manager of the Compressor Division, Worthington Pump & Machinery Corp., has organized the Paullin Equipment Co., Buffalo, which will deal in new and rebuilt mechanical and electrical equipment including the reconditioning of compressors and vacuum pumps, and act as consulting engineers and manufacturers agents. Mr. Paullin, a graduate of University of Colorado, was associated with the Worthington firm for 16 years. Prior to that he was with the General Electric Co., Schenectady, N. Y. During the recent war he served in the Pacific area and was discharged with the rank of lieutenant colonel.

♦ ♦ ♦

John W. Lohnes, for the past 2 years district sales manager, Vanadium Corp. of America, New York, has been appointed general sales manager, International Graphite & Electrode Corp., St. Marys, Pa. Mr. Lohnes, associated with Vanadium for 11 years, served in its New York and Chicago offices. Prior to that he was connected with the Carnegie-Illinois Steel Corp., Pittsburgh. He will make his headquarters in the main office of International Graphite in St. Marys.

♦ ♦ ♦

W. H. Holtz, recently elected chairman of the Chesapeake Chapter of the American Foundrymen's Association for the year 1947-48, is superintendent, American Brake Shoe Co., Baltimore. Mr. Holtz became associated with the metal industry in 1916, when he joined the Midvale Steel & Ordnance Co., Philadelphia. Later he was connected with Lukens Steel Co., Coatesvile, Pa., where he was employed in the foundry. In 1923 he became a molder in the Baltimore plant of American Brake Shoe Co., subsequently being appointed foreman in various departments and later general foreman. He has been superintendent of the plant there since 1939. Mr. Holtz served as vice chairman of the Chesapeake Chapter last year.

♦ ♦ ♦

R. G. McElwee, foundry alloy division manager, Vanadium Corp. of America, Detroit, has been named chairman of the Gray Iron Division of the American Foundrymen's Association, succeeding Russell J. Allen, metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J., who has resigned because of ill health. Mr. McElwee was appointed vice chairman of the division at the annual meeting this spring. He has been identified with the castings industry for 30 years, beginning his career with the Muncie Foundry & Machine Co., Muncie, Ind., and later was associated with General Motors Truck Co., Pontiac, Mich.; American Car & Foundry Co., Detroit; Whitehead & Kales Co., River Rouge, Mich.; and Ecorse Foundry Co., Ecorse, Mich.

V. A. Crosby, metallurgical engineer in charge of sales, service and development for Climax Molybdenum Co., Detroit, succeeds Mr. McElwee as vice chairman. Mr. Crosby has been associated with Climax Molybdenum since 1934. Previously he was foundry metallurgist with Studebaker Corp., South Bend, Ind., and, earlier, chief metallurgist for Packard Motor Car Co., Detroit. He is a past chairman of the Detroit Chapter of the AFA and a graduate of the University of Mississippi, where he received his bachelor of science degree in chemistry.

♦ ♦ ♦

Rodney P. Steltz, who became president and general manager of Myerstown Foundry & Machine Works Inc., Myerstown, Pa., when it was incorporated in January, 1947, has been associated with the company since 1929. A graduate of Albright College, Mr. Steltz taught science and history in high school for a brief period, until he joined Myerstown Foundry which was operated by Joseph Painter & Sons. He was assistant superintendent from 1929 until 1942, when he became general manager. The business, which was established at Bernville, Pa., in 1854, was transferred to Myerstown in 1872, and has operated continuously since that time as a jobbing foundry, producing heavy duty gray iron castings.

♦ ♦ ♦

Harry W. Holt has been appointed general sales manager, Hupp Corp., Detroit, contract manufacturers. Mr. Holt went to Detroit as one of the organizers of Bohn Aluminum & Brass Corp., and remained with the company until 1938. Subsequently he was vice president, Wilson Foundry & Machine Co., Pontiac, Mich., resigning recently from that position.

♦ ♦ ♦

Alfred A. Hilbron has been appointed convention and exhibit manager, American Foundrymen's Association, Chicago. Mr. Hilbron, who joined the AFA staff in September, has been engaged in exhibit work for the last 15 years, commencing with the Century of Progress in Chicago.

(*Continued on page* 108)

EDWARD M. PAULLIN

JOHN W. LOHNES

W. H. HOLTZ

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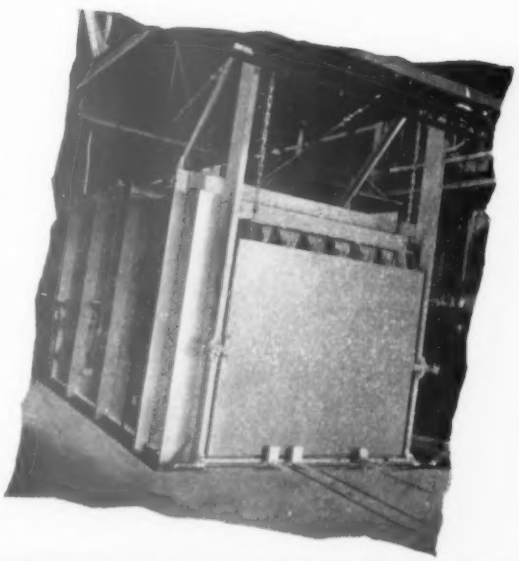

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(*Continued from page* 106)

For the last 10 years he has been exhibit manager and assistant front office manager, Hotel Sherman, Chicago, which has given him an excellent background in connection with details of conventions and exhibits. **William Brede** of Minneapolis, show manager at the Cleveland 1946 AFA Foundry Show, has been engaged to manage the Philadelphia Convention exhibits at Convention Hall there, in May, 1948.

♦ ♦ ♦

Alexander MacFarlane has been appointed executive assistant to the general sales manager, Corn Products Refining Co., New York. In addition to his new duties, which will include direction of product and market research, Mr. MacFarlane will continue administrative supervision over chemical sales. **Harold Francis,** formerly manager of the company's Chicago office, has been appointed assistant general sales manager of the eastern division. **Warren Winter,** formerly manager of the Indianapolis office, succeeds Mr. Francis at Chicago.

♦ ♦ ♦

W. F. Bates, until recently associated with Rheem Mfg. Co., has been named New England regional sales manager for Phosphor Bronze Smelting Co., Philadelphia. **H. C. Geittmann Jr.,** who has been sales engineer for Standard Steel Works Division, Baldwin Locomotive Works, and foundry engineer for Steel Sales Corp., has been made casting division sales manager of the Phosphor Bronze organization.

♦ ♦ ♦

Navy Pier Branch, University of Illinois, Chicago, has added three new members to its foundry and pattern shop instruction staff. **S. S. Silberg,** first secretary of the AFA student chapter at the University of Minnesota, and more recently in service in the Navy, has been named instructor in mechanics. **Glenn E. Cramer,** formerly superintendent of the alloy foundry, American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., has been appointed instructor in pattern design and foundry practice. **Roy W. Schroeder,** formerly foundry instructor, Washburne Trade School, Chicago, has become instructor in foundry laboratory and pattern design. In addition, **Wayne A. Wright,** until recently on the AFA national office staff in Chicago, has been made mechanical assistant. **Robert E. Kennedy,** secretary emeritus of the AFA and, prior to his long service with the association, assistant professor in charge of foundry practice, University of Illinois, Urbana, Ill., has for the past year been in charge of foundry and pattern shop instruction work at the university's Navy Pier Branch.

♦ ♦ ♦

Archibald H. Ballard has been appointed director of research for Norton Co., Worcester, Mass., in charge of its research laboratories at Chippawa, Ont., succeeding the late Raymond R. Ridgway. Mr. Ballard will be assisted by **Wallace M. Hazel,** chief chemist, and **Fred H. Young,** control engineer. **Guy H. Fetterley** has been named research engineer, responsible for the products research section and **John A. Tupper,** research engineer in charge of the manufacturing control section.

♦ ♦ ♦

J. H. Gougler is district manager of a newly opened branch office of the W. G. Reichert Engineering Co., Newark, N. J., at 11357 Michigan Ave., Chicago. Mr. Gougler is a graduate of the University of Illinois and recently was foundry instructor at the University of Illinois Extension School, Chicago. Prior to that he had 11 years with the U. S. Navy, spending the major part of his Navy assignment at Fairbanks-Morse, Beloit, Wis., supervising Navy inspection of diesel engines. Before going with the Navy, Mr. Gougler had been associated with Whiting Corp., Harvey, Ill., for about 17 years.

♦ ♦ ♦

S. C. T. Lloyd, John Kramer and **Plin Mears** have been appointed southwestern, mid-western and western regional sales managers, respectively, for the Rapids-Standard Co. Inc., Grand Rapids, Mich. Mr. Lloyd, formerly factory representative for the company in Toledo, O., has opened an office in New Orleans. Mr. Kramer, previously with the Standard Oil Co. sales organization in Kansas City, Mo., will maintain his office there. Mr. Mears, until recently manager of the Turret Truck Division, Salsbury Motors Inc., Pomona, Calif., has established a temporary office in Los Angeles, to be transferred to San Francisco early next year.

♦ ♦ ♦

Harry L. Buckingham, for the past year and a half general superintendent, the Anchor Foundry Co., Bedford, O., has been appointed plant manager of the Marion Casting Co. Inc., Marion, O. Mr. Buckingham entered the foundry industry at the age of 16 with the Marion Malleable Iron Co., and later became manager of Kenton Foundries Inc., Kenton, O. From 1942 to 1946 he was general superintendent at the General Casting Co., Morral, O., when he joined the Anchor Foundry Co.

♦ ♦ ♦

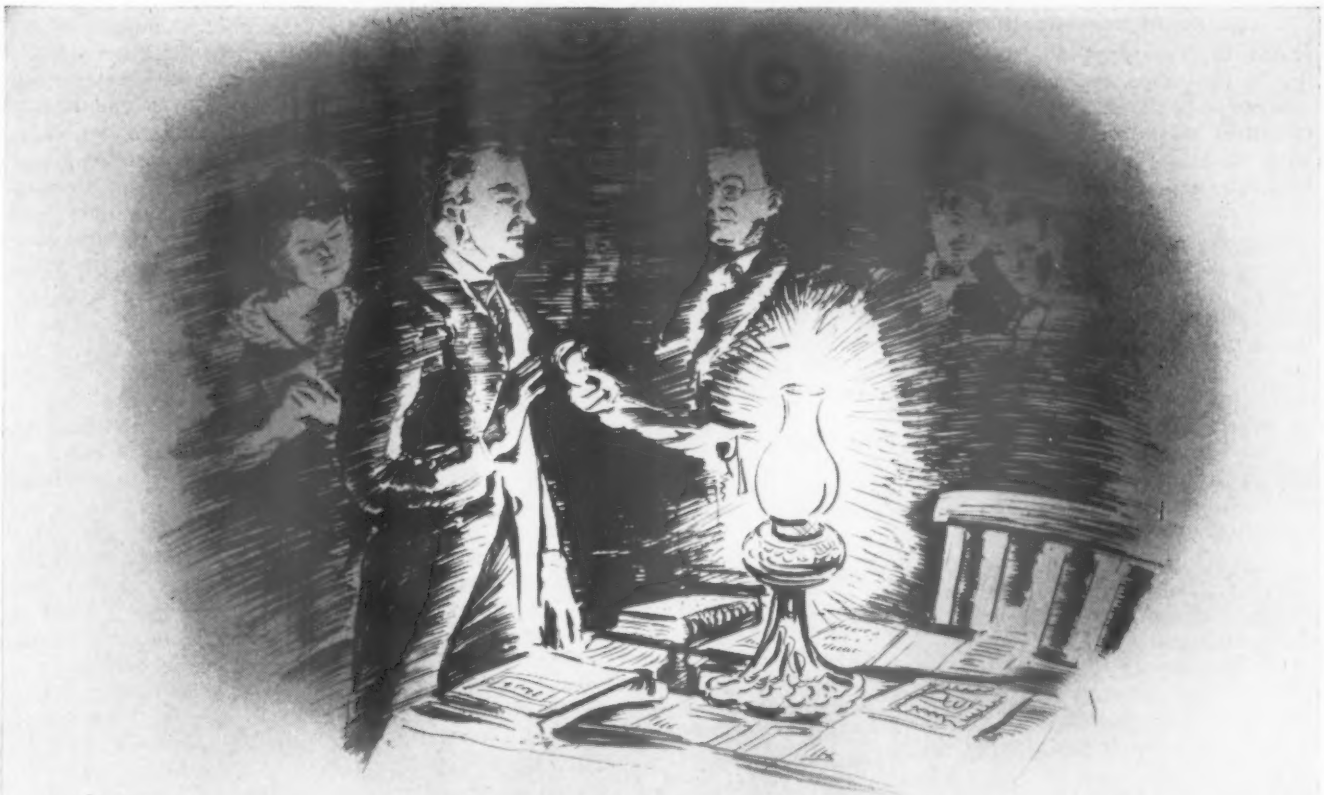
Frank A. Young, since 1944 a representative in Allis-Chalmers Duluth, Minn., branch office, has been named manager of the office. Mr. Young

(*Continued on page* 110)

HAROLD FRANCIS

ALEXANDER MacFARLANE

WARREN WINTER



Remember back when...

Coolidge was sworn in by lamplight . . . the country was emerging from the depression following World War I . . . the Hunchback of Notre Dame and Scaramouche were movie hits . . . King Tutankhamen's tomb was opened . . . Clarence Darrow and William Jennings Bryan debated the theory of evolution . . . radio news broadcasting started, and headphone receiving sets were fashionable . . . Emile Coué treatments prescribed repeating, "Every day, in every way, I am getting better and better".

All of these events came close to the birth of BAY STATE, November 1, 1922.

Since these early '20 days, the research and engineering facilities of Bay State have introduced many improvements and refinements in grinding wheels, and we are rightfully proud of our contributions to American industry.

From a small beginning, to our present world-wide distribution, comes convincing proof of the acceptance of Bay State's complete line of high quality abrasive products.

With sincere thanks to our customers and friends who made this growth possible, we salute the past and eagerly look forward to the future.

BAY STATE REG. U. S. PAT. OFF.

25th Anniversary

Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.

(*Continued from page* 108)

joined the company in 1923, working in the shops, has served in the erecting department, engaged in special field work and was connected with the basic industries department before being transferred to Duluth.

♦ ♦ ♦

John H. Keating has been elected vice president in charge of manufacturing of the Monarch Aluminum Mfg. Co., Cleveland. Mr. Keating joined Monarch in 1929 as foreman of the polishing department. Directors also elected **Edward C. Bloomberg,** treasurer, **S. C. Sawyer,** secretary and **Robert I. Kopper,** assistant secretary. **Raymond Deutsch,** president, and **H. J. Deutsch,** vice president, were re-elected.

♦ ♦ ♦

R. A. Minnear, who has been elected chairman of the Central New York Chapter of the American Foundrymen's Association, is foundry superintendent in charge of the Painted Post, N. Y., foundry and pattern shop of Ingersoll-Rand Co., New York. Mr. Minnear was graduated from the University of Michigan with a degree in mechanical and industrial engineering. While in engineering school there he worked during the summers for Chain Belt Co., Milwaukee, and Western Electric Co., in Chicago. He became associated with Ingersoll-Rand Co. in 1929, as foundry engineer at the Painted Post plant, and became foundry superintendent in 1933. Mr. Minnear has served the Central New York Chapter as director, secretary, and as vice chairman last year.

♦ ♦ ♦

S. E. Denno has been appointed sales engineer by Buckeye Products Co., Cincinnati, O., manufacturer of foundry facings, supplies and equipment. His territory will include Michigan and northern Indiana. A native of Buchanan, Mich., Mr. Denno was introduced to foundry work at Clark Equipment Co. 13 years ago. He started work in the pattern shop, and later was placed in charge of all sand control. Prior to assuming his new position, he was responsible for the requisitioning of all materials and supplies for the foundry.

♦ ♦ ♦

William L. Gabbert has been appointed manager of the New York sales office of the American Air Filter Co. Inc., Louisville. Mr. Gabbert, a graduate of the University of Kentucky, has been associated with the company since 1935, serving in various capacities including that of district sales manager.

♦ ♦ ♦

Wilber F. Pray has been appointed New York district manager, Askania Regulator Co., Chicago. Mr. Pray has been associated with the company since its organization. The New York district office will be located in the General Precision Equipment Corp. (Askania's parent company) Bldg.

♦ ♦ ♦

E. R. Hinton, associated with Olympic Steel Works, Seattle, for 30 years, has been elected president to succeed the late C. W. Kucher, founder and president. **Ronald E. Kucher,** who succeeded his father as president of Olympic Foundry Co., also of Seattle, is the new vice president of Olympic Steel.

♦ ♦ ♦

W. W. Murray, formerly associated with National Bearing Division, American Brake Shoe Co., has joined Lawrence Copper & Bronze Co., Pittsburgh.

♦ ♦ ♦

Wayne E. Martin, formerly sales manager, the Beryllium Corp., of America, New York, has joined William F. Jobbins Inc., Aurora, Ill., and will direct sales of aluminum alloys for the company in northern Ohio, and the eastern seaboard states, with headquarters at 2135 Columbus Rd., Cleveland 13. In addition, Mr. Martin will act as development engineer for company products. His previous associations in the aluminum and nonferrous metal fields include General Bronze Corp., Sperry Gyroscope Co. Inc., and National Smelting Co., as metallurgical engineer.

♦ ♦ ♦

G. E. Mehleck, sales representative and field engineer in the southeastern territory of the Brush Division, Osborn Mfg. Co., Cleveland, has been transferred to the company's district office in Chicago. Mr. Mehleck has been associated with Osborn for 6 years. **Ralph H. Martin** succeeds Mr. Mehleck as representative and field engineer in Maryland, Virginia, North and South Carolina. Mr. Martin formerly was associated with the Westinghouse Electric Corp. in Pittsburgh, prior to service as liaison officer on special development projects for the Bureau of Aeronautics.

♦ ♦ ♦

H. T. Riley, formerly vice president and manager, Fresno Iron Works, Fresno, Calif., has joined Caswell & Co., Los Angeles, dealers in foundry supplies. Mr. Riley was manager of Quality Foundry & Mfg. Co., Los Angeles, prior to his association with Fresno Iron Works.

♦ ♦ ♦

Benjamin E. Sivyer, formerly divisional sales manager in Milwaukee for Chain Belt Co., has been appointed Wisconsin district sales manager for the company.

♦ ♦ ♦

Richard L. Wilcox has been elected president, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., succeeding **David C. Griggs** who has

(*Concluded on page* 112)

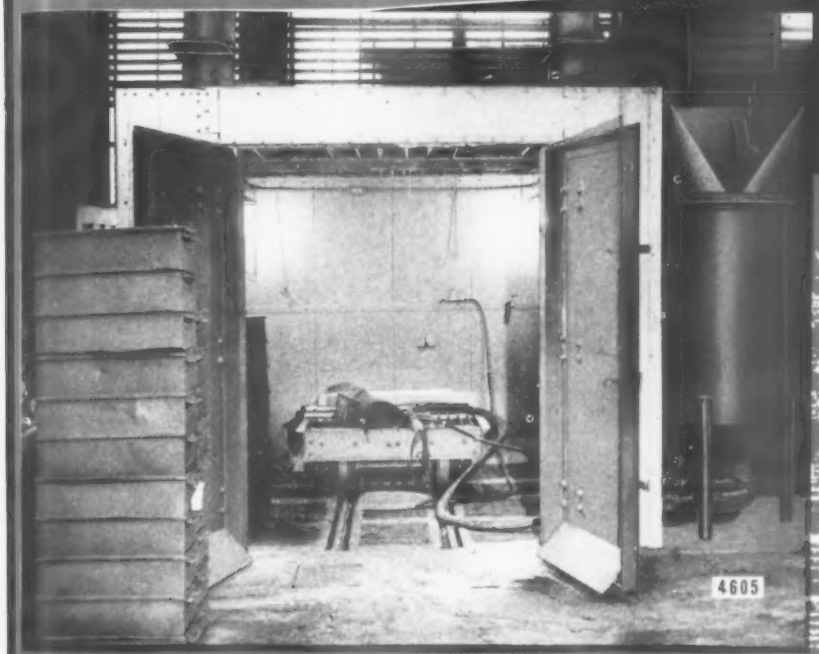
JOHN H. KEATING

R. A. MINNEAR

S. E. DENNO

WILLIAM L. GABBERT

FOR YOUR CLEANING ROOM



SLY BLAST ROOM

This Blast Room receives the rough castings for blasting. The operator wears a Sly Helmet (shown on the car). Piping connects Room with the Sly Filter.

Sly features are: excellent illumination from plenty of dust-tight lighting fixtures; over-all, down-draft ventilation from *triple* construction ceiling; safety and ease in working aided by double floor of grating and perforated plates; used abrasive automatically cleaned and returned. All these help get more production.

Sly Blast Room (above) and Sly Dust Filter (below) at The Apex Electrical Mfg. Co., Cleveland, Ohio

SLY DUST COLLECTOR

This Dust Collector is connected with the Sly Blast Room by piping through which the dust-laden air is exhausted. Upon reaching the Filter, all dust is removed, by filtration through cloth, and drops into a hopper from which it is drawn off into a wheelbarrow underneath.

Installed five years ago, this Sly Dust Collector, like thousands of others, has given highly satisfactory service and has cost but little to operate and maintain. By efficiently exhausting the dust-laden air from the Blast Room, it has helped to do better blasting, in greater volume.

Have you a problem involving *dust* or *blast cleaning*? We'd like to hear from you.

THE W. W. SLY MANUFACTURING CO. 4753 TRAIN AVENUE

(*Concluded from page* 110)

been elected chairman of the board. Mr. Griggs, who has been associated with the company for 54 years, served first as secretary, later as general manager and vice president and became president in 1930. Mr. Wilcox joined the company in 1898 as a draftsman, later became chief engineer of the Bolt & Screw Division, was elected to the board of directors in 1920, and vice president in 1928. **Joseph M. Schaeffer,** who has served as Mr. Wilcox's assistant for many years, succeeds him as chief engineer.

♦ ♦ ♦

B. H. Johns, for the last seven years manager of the St. Louis branch, Independent Pneumatic Tool Co., Chicago, has been appointed manager of the company's mining and contractors tool sales division. Mr. Johns has been a member of the company's sales organization for 21 years and served previously as manager of the Philadelphia branch. **W. B. Smith,** former manager of the Houston branch, will succeed Mr. Johns, and **R. F. Caslin,** former electric tool service engineer in the Houston territory, has been appointed to succeed Mr. Smith.

♦ ♦ ♦

W. H. Cantelon, president, Auto Specialties Mfg. Co. (Canada) Ltd., Windsor, Ont., subsidiary of Auto Specialties Mfg. Co. Inc., St. Joseph, Mich., has been named chairman of the Canadian Malleable Institute, succeeding the late H. J. Bassett, who was manager of the Galt Malleable Iron Co. Ltd., Galt, Ont.

♦ ♦ ♦

Arthur G. Chase has been elected president and chairman of the board, Precision Castings Co., Syracuse, N. Y., succeeding the late Fred P. Assmann. Mr. Chase was formerly executive vice president and treasurer of the company.

♦ ♦ ♦

Donald W. Gunther has been appointed metallurgist for all plants of National Radiator Co., Johnstown, Pa. Mr. Gunther was formerly metallurgist for Westinghouse Electric Corp., Trafford, Pa.

♦ ♦ ♦

William M. Sheehan, vice president, General Steel Castings Corp., Eddystone, Pa., has been elected a director at large of the American Society of Mechanical Engineers.

♦ ♦ ♦

A. E. Cartwright has resigned as sales and technical representative, Canadian Foundry Supplies & Equipment Ltd., Montreal, to become metallurgist with Crane Ltd., of the same city. Mr. Cartwright is chairman of the Eastern Canada and Newfoundland Chapter of the American Foundrymen's Association.

♦ ♦ ♦

John St. Lawrence has retired as assistant manager of the Erie, Pa., Works, General Electric Co. Mr. St. Lawrence, who has been associated with the company for nearly 34 years, served as assistant works manager for 21 years.

♦ ♦ ♦

Joseph G. Magrath, until recently sales manager, McAlear Mfg. Division, Climax Industries Inc., Chicago, has been appointed executive secretary of the American Welding Society, New York. Mr. Magrath formerly was associated with the Air Reduction Sales Co.

FRANK W. KLATT
Elected president of the W. W. Sly Mfg. Co., Cleveland, as reported in THE FOUNDRY *for October*

♦ ♦ ♦

F. A. Loosley has been appointed vice president and manager, Dominion Foundries & Steel Ltd., Hamilton, Ont. **F. H. Sherman** has been made vice president and works manager and **E. H. Ambrose** has also been appointed a vice president of the company.

♦ ♦ ♦

D. C. Williams, recently AFA Research Fellow at Cornell University, has joined Ohio State University as assistant professor in the industrial engineering department. Mr. Williams will engage in instruction and research in foundry technology.

♦ ♦ ♦

Joseph Gurland has joined the staff of Battelle Institute, Columbus, O., where he will be engaged in nonferrous metallurgy research. Mr. Gurland was graduated from New York University, with degrees in chemical engineering and metallurgy.

R. A. Henderson has been elected president, Meadville Malleable Iron Co., Meadville, Pa., succeeding the late **John E. Reynolds.** Mr. Henderson has been vice president of the company and has served on its board of directors for 10 years.

♦ ♦ ♦

F. W. Gardner resigned recently as chief industrial engineer, Wilson Foundry & Machine Co., Pontiac, Mich., to join Management Engineer Research Institute, Detroit, as vice president, a position he held before joining the Wilson company.

♦ ♦ ♦

Nelson Glanding, formerly metallurgist, Fort Pitt Steel Casting Division, McKeesport, Pa., has joined the sales department of Hickman Williams & Co., Pittsburgh, specializing in installation of chemically coated sand systems.

♦ ♦ ♦

Lance H. Cooper, London, for the last 20 years a member of Mond Nickel Co., British subsidiary of International Nickel Co. Inc., New York, has been elected an assistant secretary and assistant treasurer, International Nickel Co. of Canada Ltd.

♦ ♦ ♦

Ira C. Eaker, former deputy commanding general, chief of air staff, U. S. Army, has been made a vice president of Hughes Tool Co., Houston, Tex. He will serve as assistant to Noah Dietrich, executive vice president.

Correction

Errors occurred in pouring temperature ranges indicated in the article "Effect of Chills on Rate of Solidification of Gun Metal," presented in THE FOUNDRY for October, p. 72. In the investigations discussed it was stated that pouring temperatures were 1150° C ± 50° C and 1100° C ± 50° C. These temperatures should have been shown as 1150° C ± 5° C and 1100° C ± 5° C.

Offers New Book On Aluminum

Aluminum Co. of America, Pittsburgh, recently has issued a new booklet entitled "Alcoa Temper Designations for Cast and Wrought Products." It contains 15 pages, and describes a comprehensive system for indicating the temper of its products, consisting of a letter for the basic temper followed by one or more digits for specific definition.

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INDUSTRY'S MULTI-PURPOSE PROCESS
FOR FASTER LOW-COST PRODUCTION
. . . . FOR CUTTING ALL MATERIALS

Sweeping economies in die making over old methods
Shape-cutting "castings" and "forgings" from ordinary stock material
Tools of all kinds like these micrometer parts are cut fast, accurately
Patterns and templates are cut with speed. Edges are smooth—no bur
"Stampings" made by stack-sawing. There's no cost of punches and die
19 Models

Contour Sawing saves industry thousands of man-hours every day. It differs from other machine-tool processes in that it does not waste time "whittling" stock to shape but *slices* off unneeded parts – even hard alloys and tungsten carbide. Makes internal or external, curved or straight cuts at any angle. Operators trained in few days – do not need years of machinists' experience. With many special blades and infinitely variable speeds, *Contour Sawing* cuts anything and makes amazing production economies in all industries. Ask about the special DoAll customer research service, free movie for industrial groups, schools, etc.

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Reg. U. S. Pat. Off.

REPRESENTATIVES IN 56 COUNTRIES

DoALL STORES IN KEY CITIES

Des Plaines, Illinois

INTERNATIONAL COMMITTEE

Meets During Belgian Congress

By VINCENT DELPORT
European Manager
THE FOUNDRY

TO COMMEMORATE the centenary of the foundation of the Association of Engineers an exhibition was organized at Liege, Belgium, from Aug. 9 to Sept. 28. The aim of this exhibition was to make as widely known as possible the most recent developments in industrial scientific research and control. Concurrently with the exhibition a metallurgical congress was held from Sept. 1 to 14, the theme of the congress being "The Past, the Present and the Future of Belgian Industry."

Quite naturally the annual convention of the Association Technique de Fonderie de Belgique was held as a part of the metallurgical congress. A foundry section was also included in the exhibition, and the opportunity had been taken to call the annual meeting of the International Committee of Foundry Technical Associations. Sessions of the foundry meeting were held on Sept. 10, 11 and 12 with lively discussions on eleven papers that were presented. These papers were as follows:

"The Foundry Industry in Belgium," by R. Deprez, president of the association. "Future Prospects of Steel Castings in Competition with Forged Steel and Fabricated Steel Parts," by A. Hencks, manager of the steel foundry of the Dommeldange works of A. R. B. E. D. Luxemburg. "The Equipment of Foundries," by R. Doat, department chief, Compagnie Generale des Conduites d'Eau. "High Duty Cast Irons," by G. Halbart, director of Fonderies Magotteaux and technical secretary of the association. "Nickel Alloy Cast Irons," by J. Bairiot, director of the Belgian Center of Information for Nickel.

"Evolution of the Scientific Factor in the Metallurgical Industries," by M. Chevenard, scientific director, Societe de Commentry-Fourchambhault, France. "Nonferrous Metals," by R. d'Andriessens, managing director of Fonderies Montefiore, Brussels. "Alloy Castings with High Percentage of Magnesium," by J. Ophoven, Fonderies de la Fabrique Nationale, Herstal. "Pouring Under Pressure," by J. Leusler, Etablissements Gasquy, Herstal. "Enameling of Cast Iron," by J. Goffart, departmental manager of the foundries of Societe Cockerill, Seraing, Liege. "High Frequency Furnaces," by M. Bosch, lecturer at Ghent University, and Mr. Hamers, assistant lecturer.

The International Committee of Foundry Technical Associations held its annual meeting on Sept. 11 at the palace of the Prince Bishops, the seat and residence of the governor of Liege province who officially welcomed the delegates before the meeting. The technical associations of Belgium, Czechoslovakia, France, Great Britain, the Netherlands and the United States were represented by their delegates. Delegates of the Polish association were unable to attend. President J. Lobstein, past president of the Association Technique de Fonderie de France, was in the chair.

VINCENT C. FAULKNER

At the meeting of the main committee, Professor Pisek and Dr. Jenicek extended an official invitation on behalf of the Czech Technical Foundry Association to hold the next international congress at Prague in September, 1948. This invitation was unanimously accepted. A schedule of future international congresses was then agreed upon, the following dates and places having been fixed: 1948 Czechoslovakia; 1949 The Netherlands; 1952 United States. Intervening years will presumably be filled in at the Prague meeting. The committee then elected its officers for the year 1948.

Vincent C. Faulkner, editor of the *Foundry Trade Journal* and past president of the Institute of British Foundrymen, was unanimously elected president. The Association Technique de Fonderie de Belgique was invited by unanimous vote, through its president, R. Deprez, to nominate the vice president of the committee. Tom Makemson was re-elected honorary secretary by acclamation.

At the suggestion of the AFA, presented by its delegate, Vincent Delport, the committee agreed that the secretarial office should be organized as a clearing house where all information pertaining to the technical foundry associations that are members of the committee would be collected, so that foundrymen would thus have the means of finding out the aims and conditions of admission to the various associations and have an opportunity of becoming members of these associations.

The International Committee on Methods of Testing Cast Iron also held its meeting, with Dr. J. E. Hurst, president, in the chair. The honorary president, Prof. Albert Portevin, was present. Two reports on the developments of testing methods and the preparation of test pieces since 1939 were presented by the AFA and the Institute of British Foundrymen, respectively. The committee decided that each member association would be invited to submit a similar report in answer to a questionnaire which would be circulated. The questionnaire would be drafted by the chairman and the secretary who would also prepare in time for the next meeting in Prague a combined report showing in tabular form the conclusions arrived at by the various associations.

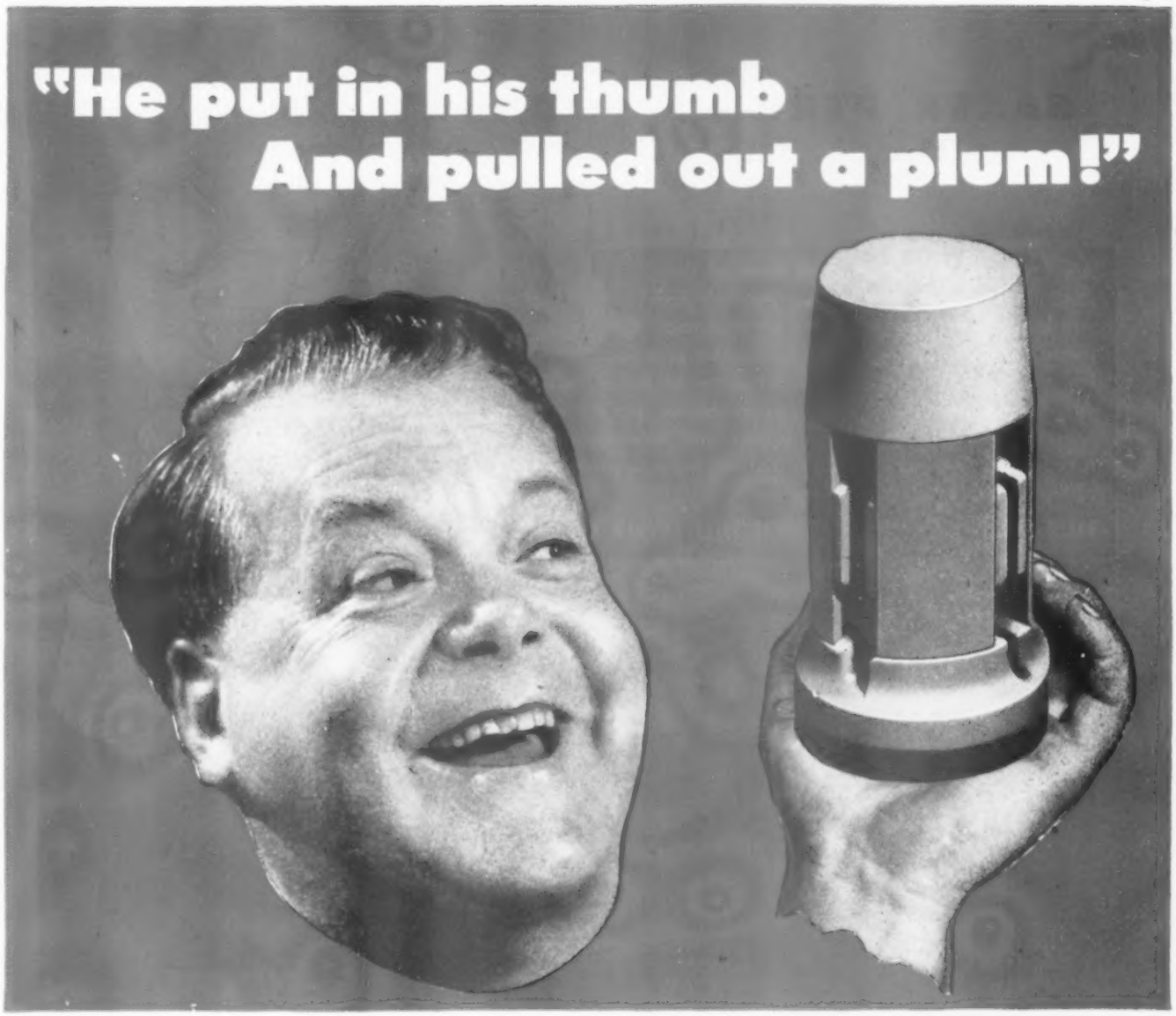
The committee re-elected Professor Portevin as honorary president and Dr. Hurst as president for the year 1948, and Tom Makemson was re-elected honorary secretary.

Book Review

Proceedings of the American Society for Testing Material, cloth, 1629 pages, 6 x 9 inches, published by the American Society for Testing Materials, 1916 Race Street, Philadelphia

This annual publication of the American Society for Testing Materials in addition to containing a summary of the 49th annual meeting held in Buffalo in June, 1946, presents all of the committee reports, Edgar Marburg lecture, and technical papers. Seven of the papers relate to atmospheric weathering of corrosion-resistant steels, 14 to fatigue and 16 to metals. Numerous other technical papers discuss concrete, cement and masonry materials, asphalt, bituminous materials, soils, paint, plastics, and miscellaneous ma-

"He put in his thumb And pulled out a plum!"



"THAT'S what I call a whiz-dinger! Cores like this just don't *happen*. They have to be planned — carefully — if you want to make your core room costs stay in bounds. You've got to have the proper ingredients all the way through to get the production you want from your core department. I pay close attention to the cereal binders going into the mix, because a lot depends on binder performance. I guess you'd call me a Krause fan; I've been using Krause cereal binders for a long time now."

Krause cereal binders contribute a lot to good coremaking. They mix easily, supply ample green strength, insure better permeability, shorten shakeout time and increase core production generally. On your next order, ask for Krause cereal binders — *Truscor*, if you like it lightweight; or, *Amerikor*, if you prefer heavyweight. You'll see a noticeable improvement in your production of smooth, sharp cores. Should you have a perplexing coremaking problem, phone, wire, or write us the details. We'll be glad to help you master it.

CHAS. A. KRAUSE MILLING CO., Milwaukee 1, Wis. • *World's Largest Millers of Dry Corn*

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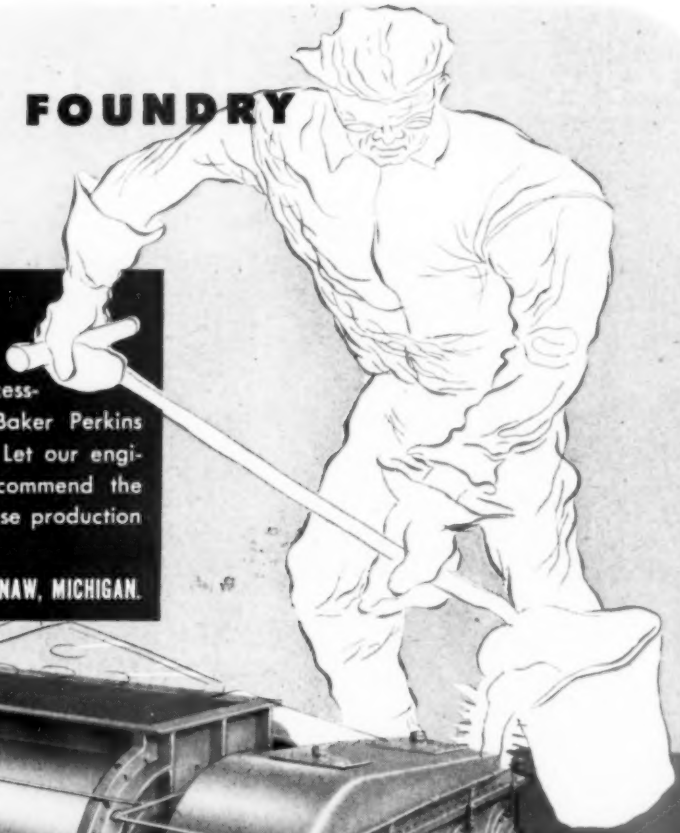
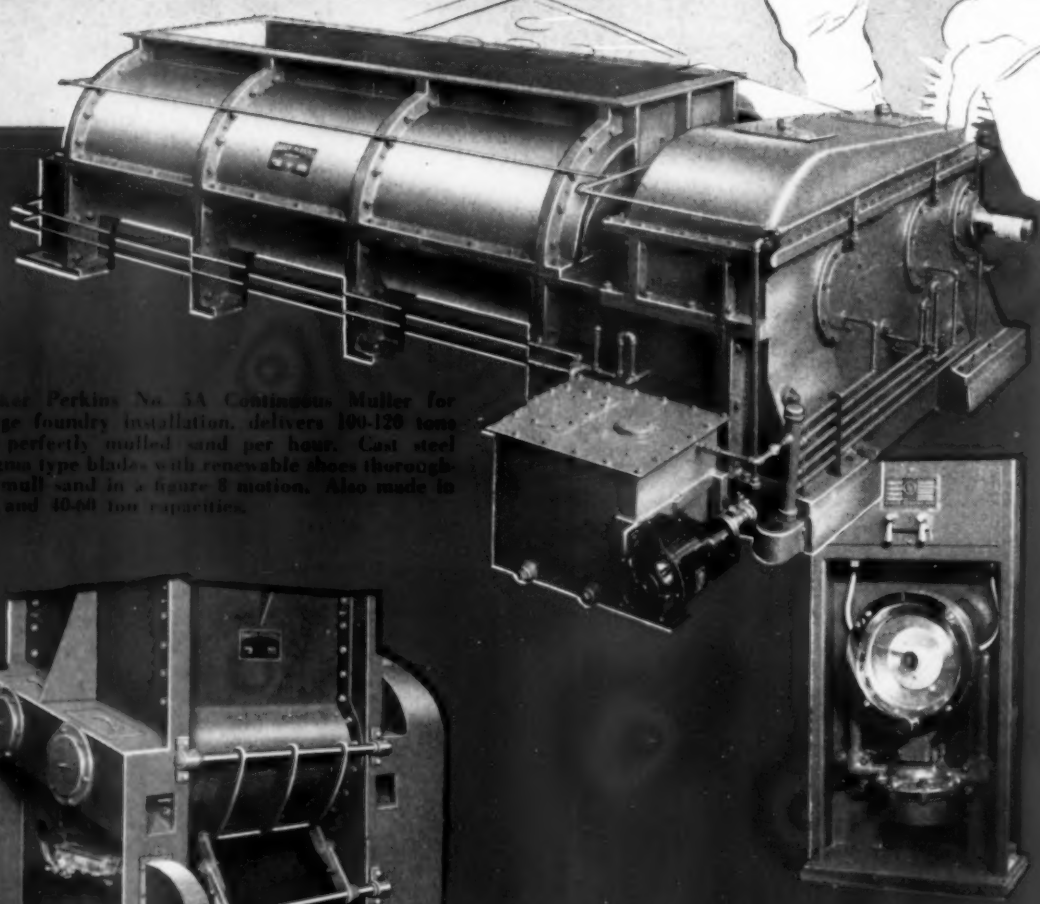
BAKER PERKINS FOUNDRY EQUIPMENT

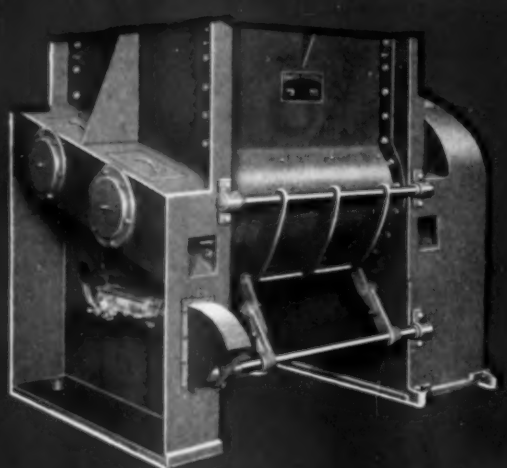


Are you concerned over rising costs of production and maintenance in your foundry? Are you losing money by producing an abnormal number of faulty castings owing to improper processing of sand? The efficient performance of Baker Perkins Foundry Equipment may solve your problems. Let our engineers review your production system and recommend the specific Baker Perkins equipment that will increase production of higher quality castings at less cost.

BAKER PERKINS INC., FOUNDRY EQUIPMENT SALES, SAGINAW, MICHIGAN.



Baker Perkins No. 5A Continuous Muller for large foundry installation, delivers 100-120 tons of perfectly mulled sand per hour. Cast steel Sigma type blades with renewable shoes thoroughly mull sand in a figure 8 motion. Also made in 30 and 40-60 ton capacities.



Baker Perkins "Quality" Core Sand Mixer. Rubs, stirs, and kneads—all in one operation. Distributes a thin layer of bond around each sand grain, assuring 100% benefit from bonds, oils, binders, and other compounds. 3½ to 20 cu. ft. working capacities.

Baker Perkins Liquid Meter for accurately and automatically measuring water or binding oil flowing into each B-P core sand mixer. Simple!—just register the amount of liquid desired on the dial, and the control mechanism does the rest. Capacities up to 600 lbs.

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STANDARD FOR GRAY IRON CASTINGS FOR VALVES, FLANGES AND PIPE FITTINGS

ASTM Designation A126-42

1. These specifications cover the following three classes of gray iron for castings such as valve bodies, fittings, flanges, including parts to be assembled into valves, manufactured in advance and supplied for sale from stock by the manufacturer, jobber, or other dealer.

Class A—Regular gray iron.
Class B—Higher strength gray iron including the so-called semi-steels used in valves and fittings.
Class C—High-test cast iron whether regular or alloy compositions.

2. The iron shall be produced under regular chemical and physical control in accordance with these specifications.

3. Drillings taken from test ingots, broken test specimens or from castings shall conform to the following requirements as to chemical composition:

Sulphur, max. per cent	0.12
Phosphorus max. per cent	0.75

4. (a) The tension test specimen shall conform to the following requirements as to tensile strength:

Class A. Regular gray iron	21,000 psi min.
Class B. Higher-strength gray iron	31,000 psi min.
Class C. High-test cast iron	41,000 psi min.

(b) After reaching a stress of 15,000 pounds per square inch, the speed of the cross-head of the testing machine shall not exceed $\frac{1}{8}$-inch per minute.

5. (a) The transverse test shall be optional. When transverse tests are made, the transverse tests specimen, when placed horizontally upon supports 12 inches apart and tested under a centrally applied load, shall conform to the following requirements:

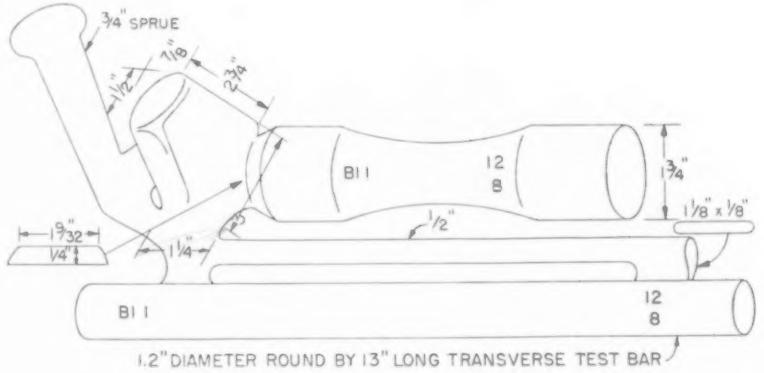
	Class A Regular gray iron	Class B Higher-strength gray iron	Class C High-test cast iron
Load at center lb min.	2500	3300	4000
Defl. at center in. min.	0.10	0.12	0.12

(b) The rate of application of the load shall be such that a central deflection of 0.10-inch is produced in from 20 to 40 seconds.

(c) In case the transverse test specimen varies from the specified diameter of 1.20 inches, a correction factor conforming to the following shall be applied:

Diameter of Transverse Test Specimen Inches	Correction Factor	Diameter of Transverse Test Specimen Inches	Correction Factor
1.10	0.770	1.21	1.025
1.11	0.791	1.22	1.051
1.12	0.813	1.23	1.077
1.13	0.835	1.24	1.103
1.14	0.857	1.25	1.130
1.15	0.880	1.26	1.158
1.16	0.903	1.27	1.185
1.17	0.927	1.28	1.214
1.18	0.951	1.29	1.242
1.19	0.975	1.30	1.271
1.20	1.000		

6. One mold containing one or more tension test specimens and, when desired, one transverse test specimen, made as indicated in Fig. 1 shall be poured at least twice a day from each heat from which castings are made under these specifications. The molds for these test specimens shall be made



These dimensions are suggested as satisfactory for average conditions, but may be varied to best suit individual pouring practices.

Fig. 1—Mold of tension and transverse test specimens

STANDARD FOR GRAY IRON CASTINGS FOR VALVES, FLANGES AND PIPE FITTINGS

ASTM Designation A126-42

from plate pattern, on a standard molding machine if possible, from the same lot of sand and in the same general way as that in which molds for the castings are made. Each specimen shall be marked to show cupola or furnace number, date and hour when mold is poured by either casting in the mold or stamping the specimens as soon as possible after shaking-out.

NOTE.—The numbering which is shown on the test specimen in Fig. 2 is intended simply to illustrate a method of designation. In the particular method shown 12/8 refers to December 8, B1 is the cupola number and the numeral 1 which follows shows the hour cast (1 p.m.).

7. (a) The tension test specimen, which may be cast as shown in Fig. 1, shall conform to the dimensions shown in Fig. 2, shall be reasonably smooth and round at breaking section, and shall be tested without machining except that the enlarged ends shall be threaded (1¼-in. U. S. standard threads are recommended). The cross sectional area at the breaking section shall be

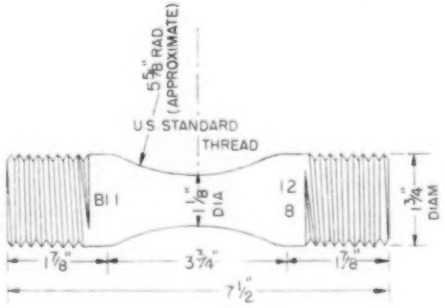


Fig. 2—Tension test specimen

within plus or minus 5 per cent of 1 sq. in. and the ultimate stress shall be calculated on the minimum cross-section.

(b) The test specimen described in Paragraph (a) has been developed to maintain uniformity of product control, particularly for large scale production for articles covered in Section 1 on scope. However, these specifications extend to the founder, manufacturer, or producer, the option, either for convenience in testing materials on individual jobs or orders placed with manufacturers not regularly producing castings under the scope of these specifications, or as a regular practice, to substitute test specimens and testing procedure in accordance with the Standard Specifications for Gray Iron Castings (A.S.T.M. Designation: A 48) of the American Society for Testing Materials. In cases of such substitutions, the requirements of Standard A 48 for both tension (as determined by the B or 1.20 in. diameter bar) and transverse tests and these requirements only shall govern, and classes 20, 30, and 40 of Standard A 48 shall be considered equivalent to classes A, B, and C, respectively of Specifications A 126.

8. Ball and socket specimen holders or spherical-seated bearings or other device which will insure that the specimen, when under load, will be as nearly as possible in pure axial tension without transverse stress shall be used in making the tension test.

NOTE.—Suitable pocket specimen holders and spherical-seated bearing device are shown in Fig. 14 and described in Section 18 (b) of the Standard Methods of Tension Testing of Metallic Materials (A.S.T.M. Designation: E8).

9. Records of the chemical composition of the iron and physical properties of the test specimens shall be systematically made and maintained.

10. The castings shall be sound, clean, free from sand, and workmanlike finish, and soft enough to machine well.

11. Upon request of the purchaser, the manufacturer shall be prepared to certify that his product conforms to the requirements of these specifications.

NOTE.—Reference may be made to the dimensional standards for pressures and temperatures formulated by the Sectional Committee on Standardization of Pipe Flanges and Fittings, under the procedure of the American Standards Association, ASA Project B 16, and more specifically to the American Standards (ASA Nos.: B16a-1939, B16b-1944, and B16b1-1931) referring respectively to the 125, 250, and 800 psi. Cast Iron Pipe Flanges and Flanged Fittings. Copies of these American Standards are obtainable from the American Society of Mechanical Engineers, 29 West 39th Street, New York City.

BACKGROUND FOR SUCCESS
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Around

DETROIT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Artificial gas plants offer potential source of coke to foundries concerned over supply of cupola fuel . . . New blast furnace to increase Ford's hot metal capacity

HIGH on the list of critically short materials in the foundry field the last few years has been foundry coke which, if not lacking in quantity, often has been considerably deficient in quality, tending to generate problems in the form of substandard iron, defective castings and high scrap loss. Immediately following the war, with the return to high-volume production of gray iron castings and the resumption of normal relationships between suppliers and users, the troubles on the score of coke were much worse than they are today. Coke company offices were being flooded with irate demands for a shipment which perhaps had gone astray or for some immediate action to improve quality. These complaints have subsided to an occasional whisper, although suppliers are still shipping every ton of coke they can turn out.

When General Motors divisions first set their sights on a postwar car and truck production level 50 per cent higher than the previous peak, it was apparent at once castings would be a bottleneck. Before this hurdle was approached, however, the shortage of flat rolled sheet and strip steel became acute and remains so to the present. Hence GM deferred its plans to move to the higher production plateau, and while it has not relaxed pressure on production, in the words of M. E. Coyle, executive vice president, it does not appear likely next few years will turn out much more than 5,000,000 units in U. S. plants in any single year.

Largest of the GM captive gray iron foundries is the Chrevrolet foundry in Saginaw, and efforts to keep coke supplies matched with cupola demand there have been touch and go. On top of this the proposed installation of 12 new cupolas has been deferred a number of times, presumably because of the tightness of the materials outlook. When the new units come into operation, an appreciable boost in coke intake will be imperative in view of the doubled capacity of the plant.

That this time is near may be deduced from reports coke is now coming into the plant from the North Shore Gas Co., Waukegan, Ill., shipments being made by car ferry across Lake Michigan and then by rail to Saginaw. Although no official announcement has been made by General Motors, talk in the trade is to the effect GM has purchased either a controlling interest in or full control of the North Shore company, primarily until this time a supplier of artificial gas and domestic coke. Equipment includes 31 Koppers-Becker by-product ovens with daily capacity of 310 tons.

Acquisition of an artificial gas plant by an automotive company as a source of foundry coke has many interesting angles. Scattered through western Michigan, central Indiana, Illinois and Wisconsin are perhaps a dozen or so plants of this type, most of them relatively small, which have been traditional sources for gas and coke. With the extension of the large gas pipelines from Texas and the Panhandle to the industrial areas of the middle west, the future of artificial gas producers becomes increasingly precarious, particularly in view of steadily mounting coal and freight costs. To the operators of large iron foundries they present interesting plums, if their location is not too remote, from the point where coal may be purchased or from where the coke is to be used.

Pipelines are now bringing gas into the Detroit and other industrial areas from the Southwest, and 70 or more new lines in similar directions either have been authorized or application made for them. Their completion waits principally on availability of the millions of tons of steel they will require. When in operation they will bring low-cost natural gas to many areas now served by local gas-coke suppliers. This presents an opportunity for a company seriously concerned over its coke outlook to acquire a producing property whose owners may be willing to sell at a reasonable price in the face of the oncoming pipelines.

No great problem of conversion exists in adapting such primarily domestic type plants to furnishing foundry coke. As gas plants, they use a high-volatile coal practically 100 per cent. To transfer the emphasis to foundry coke, it is merely necessary to change the mix to, say, 50-50 high volatile and Pocahontas. Disposal of gas and coal chemicals still must be reckoned with, but until the new pipelines are actually pumping, which may be two years or more from now, arrangements can be made readily to dispose of them.

Require 385 Tons Per Day

Juggling a few figures in the air, it appears the tonnage of coke coming to Chevrolet Gray Iron from Waukegan will greatly relieve its tight position, since current consumption averages around 385 tons daily on two shifts, operating six cupolas to produce approximately 1900 tons of iron. Rating of the Waukegan plant—310 tons a day seven days a week—probably will be increased by shifting to foundry coke exclusively, although it is not known whether all this tonnage can be shipped to Chevrolet. The company is reported to have some 400 customers of its own, and cutting them off completely might easily embarrass a parts supplier on which Chevrolet depends.

At various times, General Motors has given consideration to installation of a blast furnace and coke oven plant at Saginaw to implement raw materials foundry requirements in that area. Careful studies convinced the corporation that the expense entailed in construction of docks and unloading facilities could hardly be justified on the basis of building a single furnace, although it might be if a battery of possibly four furnaces were erected. Output of four modern blast furnaces could hardly be swallowed by even the enlarged melting capacity of Chevrolet Gray Iron now mapped out, so this would mean GM would have to put up a steel plant to handle the excess iron, and the corporation has not been too keen about going into the steel business on its own, attractive as that might appear at the present time. For one thing, the company already has extended its operations into such a wide diversity of products that the perils of overbigness must receive greater consciousness.

It has been proposed to make

(*Continued on page* 122)

Hotter than the burning sands of Death Valley

That's how hot the sand from foundry shakeouts is. Small wonder that special conveyor belting must be made to carry it!

Small wonder, too, that long-lasting Maltese Cross Hot Materials Conveyor Belting is the choice of so many foundry operators for this tough work. This famous conveyor belting is built to stand up under even the most severe foundry operating conditions. Examine Maltese Cross and you'll understand why.

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Maltese Cross Conveyor Belting

(*Concluded from page* 120)

some studies at Saginaw of the possibility of adding certain types of hydrocarbons to the Waukegan coke—at just what point it is not too clear—to enhance and accelerate the carbon-pickup properties and thus speed up cupola melting. The idea is not strictly new, for one of the leading coke suppliers before the war furnished some of its foundry customers with a "high carbon-pick-up" coke, adding pitch to the material. Increasing difficulty in obtaining the pitch compound forced gradual suspension of the technique and it has not been resumed.

Integration looks to be the order of the day as more and more manufacturing plants consolidate with sources of raw materials. Instance of large steel users purchasing small rolling mills to assure supplies of hot-rolled sheet and strip have been numerous in the past two years. Kaiser-Frazer's hook-up with the Portsmouth Steel Corp. helped to solve its steel problems, and last month K-F began operation of the Chapman-Price rolling mill in Indianapolis which was purchased outright as a source for hot rolled strip. As reported in these columns K-F also is operating a foundry division in Dowagiac, Mich., currently being enlarged to supply cylinder blocks, heads and other parts not previously cast.

Further integration of raw materials supply and manufacturing at the Rouge plant of Ford Motor Co. has been announced. Expenditure of $18 million is headed by a new 1400-ton blast furnace which will double capacity for hot metal by next September, will permit diverting output of one of the two present smaller blast furnaces exclusively to foundry iron, and will relieve the company from necessity to purchase open-hearth scrap in the outside market. Slight increase in open-hearth output will be realized from using a higher proportion of hot metal in charges and from rebuilding and enlarging three of the ten furnaces in the battery.

Meanwhile a used 42-inch reversing-type rolling mill has been purchased from Granite City Steel Co. and will be converted to an 84-inch skin pass cold mill, to augment rolling capacity on wide cold rolled strip or sheet. This will be ready by next March.

Book Review

Reynolds Aluminum Alloys and Mill Products Data Book, paper, wire bound, 248 pages, 6 x 9 in., published by Reynolds Metals Co., Dept. 47, 2500 South Third St., Louisville 1. Price $2.

Featuring 106 tables of technical data, this book helps fill the demand for technical information on aluminum alloys. The book describes aluminum alloys and mill products made by Reynolds. Information is arranged according to mill products—Sheet and plate; extruded shapes; roll formed shapes; tubing and pipe; wire, rod and bar; forging stock; press forgings; ingot metal for sand casting, permanent mold casting, and die casting. It covers range of sizes, chemical composition, yield and ultimate strengths, hardnesses, tolerances and the like.

Data on annealing and heat-treating cycles for wrought, sand-casting, permanent-mold casting, and die-casting alloys are given. A section on related specifications is arranged according to alloy designations.

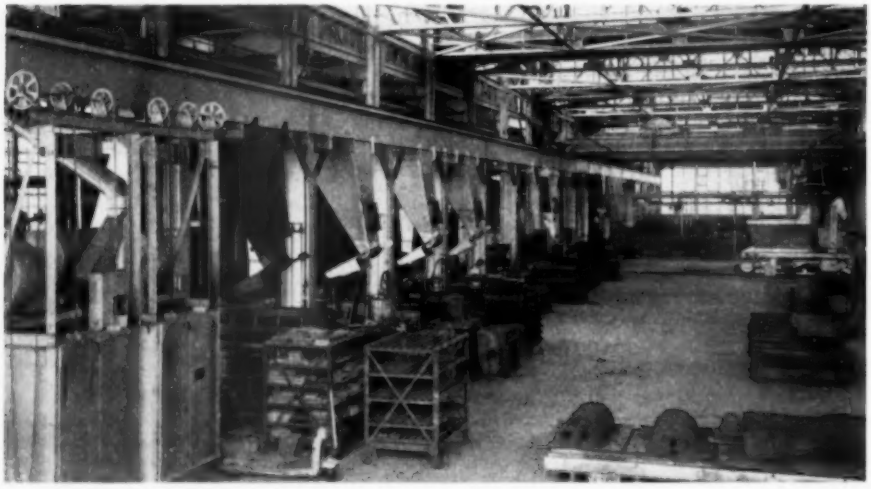
AFA Groups Start Research Projects

Research projects on fundamental problems in foundry technology proposed by the research groups of the aluminum and magnesium, brass and bronze, and malleable iron divisions of the American Foundrymen's Association have been approved by the society's directors.

The light metals group will continue and expand the study of centrifugal casting of aluminum and magnesium alloys begun last year. R. F. Thomson, metallurgist, International Nickel Co., Detroit, is chairman of this group.

A comprehensive investigation of tin bronze test bars is to be undertaken by the brass and bronze research body headed by Dr. Blake M. Loring, chief, Nonferrous Division, Naval Research Laboratory, Washington. Accurate determination of metal quality through the fracture test bars will be sought.

The malleable iron division project is intended to yield data on the most desirable microstructure for pearlitic malleable iron castings to be selectively hardened by flame or induction heating. Carl F. Joseph, technical director, Central Foundry Division, General Motors Corp., Saginaw, Mich., is chairman of the malleable research group.



HIGH ALLOY FOUNDRY: View of molding floor at new foundry recently completed at Elyria, O., by Electro-Alloys Division of the American Brake Shoe Co. for production of high alloy castings. The plant has over 150,000 sq ft of floor space, cost $3 million. Melting equipment consists of six electric furnaces with combined capacity of 17,700 lb

Offers Binder

New ring binders provide convenient storage space for issues of "USCO Newscasting," monthly digest of news about aluminum distributed to the foundry field by U. S. Reduction Co., East Chicago, Ind. Binders are maroon simulated leather, embossed with aluminum ink, and are furnished free upon request to foundrymen on the USCO mailing list.

Issues Brochure

Recently formed Fulmer Research Institute Ltd., Stoke Poges, Bucks, England, has published a brochure describing its objects, scope, facilities and equipment, and services provided. The brochure states that the activities of the organization are similar to those of Battelle Memorial and Mellon Institutes in this country.

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Exploded octagon pin and elongated bushing
Exploded round pin and bushing
Assembled octagon pin and elongated bushing

You can easily get the perfect line-up of cope and drag that will speed quantity production of true castings in your foundry. Just equip your flasks with Universal Flask Pins and Bushings, made in various standard sizes and shapes or in special types to your specifications. Taper type anchor firmly with self-locking nuts. Universal standard flask pins and bushings utilize round and elongated bushings and round pins, thus forming an assembly that insures perfect alignment and at the same time permits longitudinal expansion resulting from metal heat. They will bring greater speed to your casting production line, for the cope bushings are easily and quickly guided to the drag pins over a tapered, loose-fitting closing pin which is removed after the assembling is completed. Universal Flask Pins and Bushings are precision machined, hardened, and ground for lasting accuracy and maximum resistance to wear. Write for new catalog giving complete particulars.

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Company Veterans Are Honored

Presentation of watches to 17 men and 14 women, all veteran sales or general office employees of National Malleable & Steel Castings Co., was made Sept. 24 at the fourth annual banquet of the general office chapter of the Naco Service Society at the Cleveland Club, Cleveland.

The watches were presented by President Cleve H. Pomeroy in honor of long service with the company—35 years for men and 25 years for women.

Those who received watches are: Lillian Carbeck, Kathleen O'Brien, Blanche C. Smith, Helen V. Sheridan, Alice O'Gorman, Mabel Wright, Frances M. Stepwith, Mayme Keptner, Elizabeth R. Burns, Grace L. Tate, Frieda Lindmeier, Katharine Gebhart, Christine A. Koenig, Mary E. Clemens, and Herbert L. Mausk, George R. Farrell, Howard W. Gilbert, Frank E. Moffett, Ernest A. Pulford, William Ruple, Dan P. Ryan, Frank R. Campbell, Herbert K. Trumbull, William J. Metzger, Floyd Snyder, Raymond M. Titgemeyer, Carl L. Krauss, Paul B. Thompson, Edward A. Powell, Edward O. Warner and J. J. Byers.

Issues Personnel Bulletins

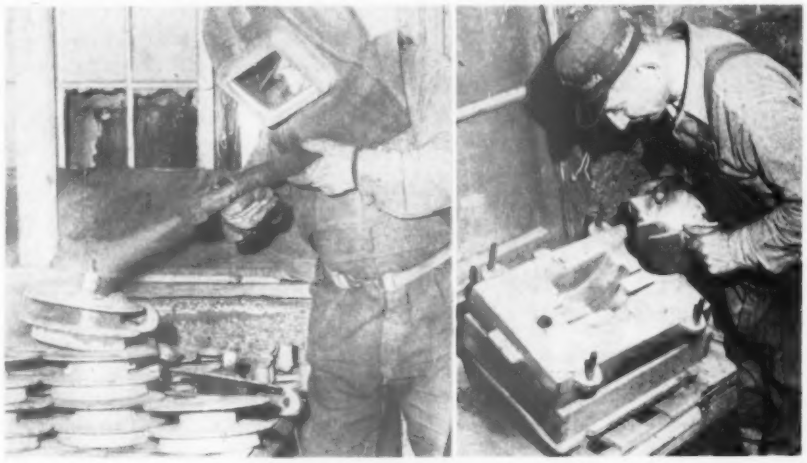
American Management Association, 330 West 42nd St., New York 18, has available informative bulletins in the Personnel Series, pertaining to problems of executives and employees, with the following titles and prices: "Economic Fundamentals of Collective Bargaining," at $1; "Training for Management Skills," at 75 cents; "Role-Playing in Supervisory Training," and "Developing Morale," at 15 cents each.

Award on Corrosion Work Established

Feeling that there is considerably more to be learned about corrosion testing and that some incentive be established to stimulate research and the presentation of papers in that field, Sam Tour, president Sam Tour Inc., New York, has contributed $1500 to the American Society for Testing Materials for that purpose. To be known as the Sam Tour Award, it will comprise a certificate of merit, a medal or cash as the award committee shall decide.

In 1946 Mr. Tour completed his quarter century as a member of ASTM, and that year also marked the 25th anniversary of the establishment of Committee B-3 on Corrosion of Nonferrous Metals and Alloys on which he served as secretary for 18 years, chairman for 4 years, and at present is a member of the Advisory Committee on Corrosion.

Casting Gurdy Spools in the Northwest



THE average foundryman may never have heard of a trolling gurdy, but it is an important item for some commercial fisherman. And in the case of certain foundries the casting of parts for a gurdy is routine procedure. As used for salmon trolling in the Northwest the gurdy consists essentially of one or more power-driven shafts on which are mounted large bronze spools. These spools serve much as does the reel on a fishing rod.

The accompanying illustrations show certain operations at the Zandt Brass Foundry, Seattle, in casting gurdy spools. Below, at left, a cored mold is being closed, and at right a worker is knocking the core from a cast spool. Above, at left, cast spools are being sandblasted, and at right the pattern has been drawn. The spools have a 4-in. diameter hub with $9\frac{1}{2}$-in. diameter flanges $2\frac{1}{8}$ in. apart. Cast to the spool proper is a 7-in. diameter brake hub. The bronze spool is cast one to a mold from 85-5-5-5 alloy.

Foundry Developments

By EDWIN BREMER

IN INTRICATE thin cores such as employed for water jackets in automotive gray iron castings, numerous steel wires are used to provide the necessary rigidity and support. Unfortunately, it often is a tedious and time-consuming job to remove some of the wires, since they must be pulled out individually with pliers or some other device. However, such trouble practically has been eliminated at Ferro Machine & Foundry Co., Cleveland, by substitution of aluminum alloy wire for steel. Wire employed is the 5 per cent silicon, 95 per cent aluminum type available under the designation 43S. Used in 1/16 and 3/32-in. diam, the wire possesses the desired stiffness for core reinforcement. When hot metal fills the mold cavity in which the cores are used, the aluminum alloy wire disintegrates and forms small pellets or particles, which are shaken out of the casting with the burned core sand.

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PROBLEM of obtaining globular, randomly dispersed sulphides in well killed steels has been recognized for years. Low iron oxide contents which favor freedom from blowholes during solidification tend to promote thin, intergranular sulphides detrimental to ductility. High iron oxide contents promote globular, randomly dispersed sulphides—a requirement for high ductility—but also increase susceptibility to gassiness. However, A. P. Gagnebin, in a paper presented at the annual meeting of the American Foundrymen's Association, proposed the use of a ladle addition of 0.08 per cent Ca and 0.05 per cent Se which, in addition to refining the grain of cast steel, coalesces the intergranular sulphides in low oxide, well killed steel and improves its ductility.

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PROPOSED revision of Simplified Practice Recommendation R185-42, Pipe Fittings, has been approved for promulgation by the Division of Simplified Practice of the National Bureau of Standards, and will be identified as R185-47, effective from Sept. 1, 1947. It applies to gray cast iron, malleable iron, brass or bronze fittings for sprinkler systems in addition to the regular lines for other purposes. Fittings to which the recommendation does not apply are listed. Section dealing with brass or bronze fittings has been adjusted to provide for sectional as well as general needs.

• • •

ISSUANCE of the *Tentative Specifications for Corrosion Resisting Chromium and Chromium-nickel Steel Welding Electrodes* (AWS designation A5.4-46T; ASTM designation A298-46T) by the American Welding Society-American Society for Testing Materials Committee on Filler Metal, has completed one more step in a program intended to provide a complete set of specifications for all types of filler metal used in welding ferrous and nonferrous metals by various processes. Classifications are grouped in six series covering the stainless steel types commonly identified as 19-9 (18-8); 25-20; 18-12 Mo (18-8 Mo); 19-9 Cb (18-8 Cb); 16 Cr, and 4 to 6 Cr-Mo. Each series includes classifications for an all-position dc electrode, an all-position ac-dc electrode, a dc downhand electrode and an ac-dc downhand electrode. Copies of the specification may be obtained from either of the societies for 25 cents each.

• • •

CAST IRON or steel inserts are most suitable for aluminum alloy castings, although copper and brass may be used if proper care is taken to prevent their solution in the aluminum. Due to differences in coefficients of thermal expansion, economical application of inserts requires definite foundry technique. Some inserts must be preheated and placed in the mold while hot, and others may require only torch drying previous to closing the mold. Inserts must be cleaned by sandblasting or other means to prevent blows. Location of risers close to the inserts also is a preventive. Sufficient metal must be provided around the inserts to eliminate cracks during solidification which are caused by stresses developed when aluminum shrinks. Inserts are held in place by mechanical retention, and the surface should be knurled or grooved to insure good "keying."

• • •

DETECTION of carbon monoxide and its amount is accomplished rapidly and simply with a device developed and used during the war. Detector consists of a small glass tube, sealed at both ends, and a rubber bulb packed into a small kit which fits into the pocket. When presence of monoxide is suspected, tips are broken off the glass tube, one end inserted in the bulb, and air is drawn through the chemical within the tube. The yellow chemicals in the tube turn green within 30 seconds if carbon monoxide is present—the darker the shade of green, the higher the monoxide concentration. A matching color chart is used to determine the height of concentration.

• • •

A VOLUNTARY Simplified Practice Recommendation for Plumbing Fittings and Trim for Housing is now available, according to the Commodity Standards Division, National Bureau of Standards, Washington. Identified as R227-47, copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, for 5 cents each. The recommendation covers necessary fittings and trim for plumbing fixtures in single and multiple dwellings. The recommendation is part of a program of simplification sponsored jointly by the Sanitary Brass Institute and Tubular Plumbing Goods Institute. Remainder of the program, covering Lavatory and Sink Traps, has been issued as R21-46.

• • •

PROCESS for protection of magnesium alloy surfaces against corrosion similar to that of anodizing aluminum alloys, has been developed by Consolidated Vultee Aircraft Corp. It involves electrolyzing with either ac or dc current in a bath containing 24 per cent caustic soda, 0.3 per cent phenol and 3 per cent sodium silicate maintained at a temperature of 185° F, using a current of 15 to 25 amperes per square foot. Exposure for 25 minutes is said to produce a coating of magnesium oxide-silicate 0.0004-in. with ac and twice that with dc. After rinsing, parts are immersed in a weak chromic acid bath to neutralize any alkali remaining on the metal. Operation is completed by air drying and application of clear lacquer to seal the surface, or if the metal is to be painted, by a coat of zinc chromate primer.

least handled . . . is best handled

In large midwest pipe casting foundry, long-shaped molds are handled on two parallel lines of Logan Roller Conveyors. This view (part of complete system) shows molds arriving at shakeout. Single line of conveyor at left returns empty flasks to molding machines.

A "flowing" movement of work in-process is one of the best ways to hold down production costs. And with Logan equipment providing the "flow," foundries also can eliminate much costly hand-handling. The less the product is handled *by hand*, the less the cost to produce it.

From molding to pouring, to shake-out, and through machining, Logan Conveyors eliminate manual effort all along the line, and provide savings in time, effort, space and in employe morale, too.

Foundries in particular, favor Logan equipment because of the extra heft and stamina built into Logan rolls, bearings, frames and supports. Long experience with foundry requirements qualifies this company as outstanding in the field of heavy handling. Write today for literature, no obligation

Preserve FREE ENTERPRISE It Built a Nation

Logan Conveyors

LOGAN CO., INC., 580 CABEL STREET, LOUISVILLE 6, KY.

Foundry Equipment Manufacturers

HOLD ANNUAL MEETING

ANNUAL meeting of the Foundry Equipment Manufacturers Association, held at Hot Springs, Va., Sept. 18 to 20, was devoted to consideration of present and possible future problems of the equipment industry. The meeting was exceptionally well attended.

The first day of the meeting was given over to conferences of the various product group committees of the association. During the last two years these product groups have developed a great deal of interest among the members of FEMA.

In opening the first general session on Friday morning, Sept. 19, Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and president of the association, stressed the importance and the responsibilities of FEMA to the foundry industry. While business continues good and the immediate problem of equipment producers is deliveries, Mr. Pfaff pointed out that the time will come when sales resistance will increase, and higher selling costs will develop. While inventories in the hands of foundry equipment producers probably are at the peak, these are considerably out of balance, and shortages of steel continue. Mr. Pfaff had no hope for immediate relief from the tight steel situation.

The president of the association stressed the need for government action in liberalizing the laws dealing with depreciation and replacement of capital assets. He pointed out that never before have foundry managers been so keenly interested in improved equipment and better production methods. Therefore, such action on the part of government would permit the foundry industry to do a better job in modernization and mechanization. Mr. Pfaff indicated that export business in machinery probably would continue in considerable volume.

Arthur J. Tuscany, executive secretary of FEMA, Cleveland, outlined the important work and the accomplishments of the association during the last year. The board of directors met four times during the year to plan and co-ordinate the activities of the organization, and the executive committee of FEMA met in joint session with the executive committee of the American Foundrymen's Association on July 22 to consider common problems.

Stresses Progress Made

Mr. Tuscany stressed the progress that has been made by the product group committees of the association. He reported that the board of directors has established a Product Group Policy Committee under the chairmanship of P. F. Bauer, manager, Industrial Sales Department, Allis-Chalmers Mfg. Co., Milwaukee, to plan and co-ordinate the activities of the various product group committees.

The executive secretary announced that the FEMA had become a founding member of the Foundry Educational Foundation, and that Bruce L. Simpson, President, National Engineering Co., Chicago, and Mr. Pfaff had been made trustees of the foundation. He also reported on co-operation with the National Castings Council.

Mr. Tuscany discussed a meeting of an FEMA Advisory Committee with the Industrial College of the Armed Forces; the work of a special committee on the revision of by-laws; the first Year Book to be published by the association, and the close co-operation which has been maintained with the AFA and other associations. He stated that 61 firms now are members of the association.

In a general round-table discussion on "The Foundry Industry—Its Present and Future Position," participated in by a representative of each company present, it was indicated that while sales of foundry equipment for the first six months of 1947 have continued at a high level, the totals in the majority of instances did not quite equal the volumes for the same period in 1946. Shipments of equipment from January to June, 1947, were considerably ahead of shipments for the first six months of 1946. The long range view on the purchase of equipment by the foundry industry appears good, according to the reports presented.

Thomas Kaveny, president, Herman Pneumatic Machine Co., Pittsburgh, and immediate past president of the association, reported that the board of directors of FEMA, at a meeting held that morning, had voted to join the National Castings Council as a founding member. Mr. Kaveny, who has been active in the development of the council, announced that Otto A. Pfaff and William L. Dean would be FEMA representatives on the council during the coming year.

Mr. Kaveny also reported on the work of the committee on by-laws, and recommended several changes which were voted unanimously.

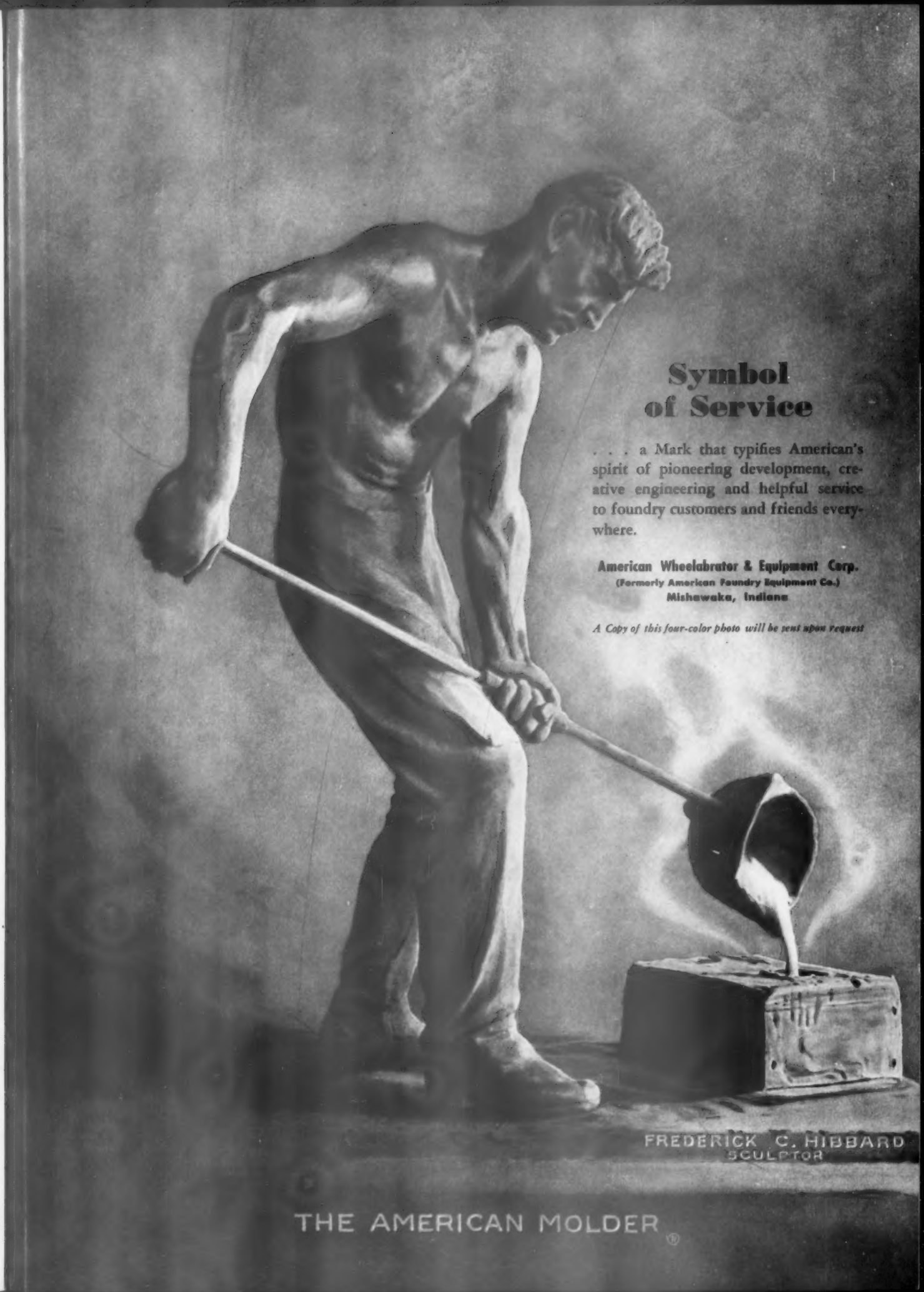
Report of the Nominating Committee was received and the following

(*Continued on page* 134)

OTTO A. PFAFF

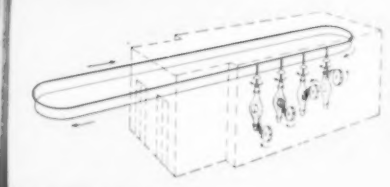
WILLIAM L. DEAN

ARTHUR J. TUSCANY

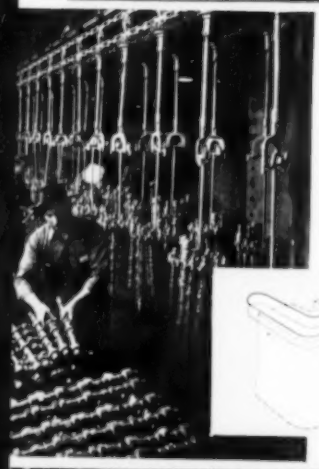

Symbol
of Service
. . . a Mark that typifies American's spirit of pioneering development, creative engineering and helpful service to foundry customers and friends everywhere.
American Wheelabrator & Equipment Corp.
(Formerly American Foundry Equipment Co.)
Mishawaka, Indiana
A Copy of this four-color photo will be sent upon request
FREDERICK C. HIBBARD
SCULPTOR
THE AMERICAN MOLDER ®

For your SPECIAL CLEANING PROBLEMS

(at left) *4 wheel Monorail Wheelabrator Cabinet* — 2 pass, indexing, spinner-hanger type — installed in the plant of a prominent Ohio steel foundry for cleaning axle housings.

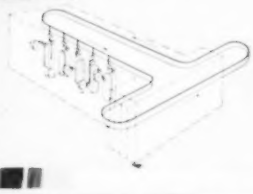


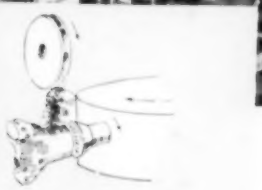
(below) *2 wheel Monorail Wheelabrator Cabinet* — single pass, indexing, spinner-hanger type in operation at the New York Air Brake Company, for cleaning air brake castings and other railway specialties.



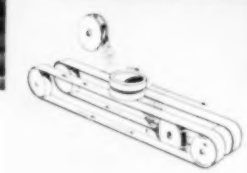
(at left) *3 wheel Monorail Wheelabrator Cabinet* — 2 pass, indexing, spinner-hanger type — used for cleaning automotive camshafts at Campbell, Wyant & Cannon Foundry.

(at left) *5 wheel Monorail Wheelabrator Cabinet* — 2 pass, constant travel, spinner-hanger type used by Port Hope Sanitary Mfg. Co., for cleaning bathtubs, lavatories, sinks, etc.





Wheelabrator Cabinet with turret-mounted rotary spindles, used in the plant of a large aircraft engine manufacturing concern for blast cleaning cylinder heads prior to metallizing.



Wheelabrator Cabinet with twin rubber belt conveyor, used by Centrifugal Fusing Company, Lansing, Michigan, for cleaning cast brake drums.

Skew-dished Roll Type Wheelabrator Cabinet for cleaning printing press roller cores at Samuel Bingham Sons Mfg. Co., Chicago.

American WHEELABRATO

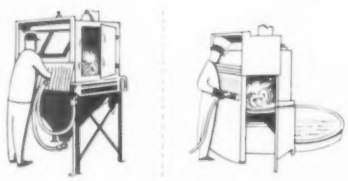
(Formerly American Foundry Equipment Co.)

LET AMERICAN'S CREATIVE ENGINEERING EXPERIENCE PROVIDE THE PRACTICAL AND ECONOMICAL SOLUTION

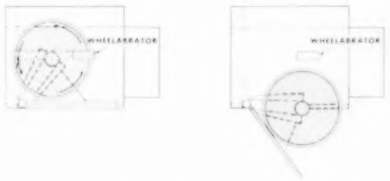
In every organization there are certain "standout" employees with ideas, initiative and imagination . . . people to whom you can turn with confidence when you want a job well done. The same condition is true among various industrial organizations. At AMERICAN there is a tradition of long-standing that leadership comes only to those who lead. That is why AMERICAN'S CREATIVE ENGINEERING has always led the field in pioneering major blast cleaning developments (see chart below). And the confidence of customers in AMERICAN'S ability to solve their cleaning problems is exemplified in the fact that more than 4,000 airless Wheelabrators are now in active use on a greater variety of cleaning applications than any other single type of blast equipment.

Partial view of our Demonstration Laboratory where the solution to cleaning problems can be accurately determined by test-cleaning in Wheelabrators of all types.

Important ENGINEERING ACCOMPLISHMENTS PIONEERED by AMERICAN



"HUMANE" BLAST CABINET AND ROOM
A Pre-Wheelabrator achievement that removed the operator from a dusty, unhygienic blast chamber, permitting him to work efficiently outside.

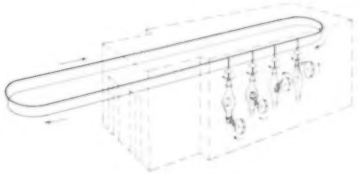


WHEELABRATOR SWING TABLE
A versatile, hygienic, machine that handles at least 80% of all Airblast Room jobs and a wide range of work for shops desiring a general purpose machine.

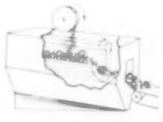
THE TUMBLAST
An exclusive AMERICAN batch-mill development. Uses endless belt conveyor — simplest method yet devised for thorough blast coverage, fast cleaning, low maintenance.

THE AIRLESS WHEELABRATOR
The revolutionary speed-cleaning, low cost cleaning method FIRST developed and perfected by AMERICAN engineers. More than 4000 units now in use.

MULTI-TABLE
This made possible the swift, positive cleaning of flat and fragile work having high vertical edges and deep pockets.



MONORAIL CABINETS
Another FIRST in the AMERICAN record of achievements, permitting the continuous cleaning of a wide variety of jobs requiring special handling or large scale production.



CONTINUOUS TUMBLAST
This unique design streamlines batch-mill cleaning production by eliminating time lost in starting, stopping and unloading.

WHEELABRATOR SPECIAL CABINETS have solved these typical problems

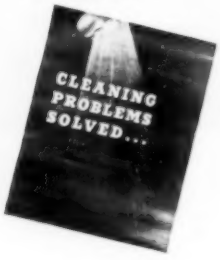
- Sanitary Ware
- Gas Cylinders
- Gears
- Locomotive Boiler Flues
- Ry. Side Frames
- Ry. Bolsters
- Ry. Air Brakes
- Ry. Car Wheels
- Steel Drums
- Cylinder Blocks
- Crankshafts
- Axles
- Axle Housings
- Driveshafts
- Camshafts
- Wheel Hubs
- Brake Drums
- Aircraft Engine Cylinders
- Propeller Blades
- Springs
- Files
- Pipe and Tubing
- Electric Motor Frames and Bases
- Shovels
- Chain
- Printing Press Rolls
- Steel Strip
- Steel Sheet
- Steel Plate
- Shot Peening Applications

EQUIPMENT CORP.
MISHAWAKA, INDIANA

Cleaning Problems Solved
FOR EVERY TYPE OF FOUNDRY

STEEL FOUNDRY

NON-FERROUS FOUNDRY



GRAY IRON FOUNDRY

MALLEABLE FOUNDRY

To illustrate the range of foundry cleaning problems handled by the Wheelabrator . . . the equipment used . . . the production speeds and cost saving advantages effected . . . we have prepared a series of four illustrated booklets, one for each of the major divisions of the foundry industry, as shown above. We believe these will give you a clearer insight as to the practical adaptation of the Wheelabrator to your own cleaning problems. A copy of any one or all of these booklets will be mailed to you without obligation.

At the same time avail yourself of the opportunity to get first hand evidence of what the Wheelabrator will do on your own production. You can have clear proof of this by sending uncleaned samples to our factory demonstration department which is equipped with representative machines from our full Wheelabrator line. When the test is finished the samples will be returned to you for inspection and you will receive a complete report, together with recommendations for the equipment most suitable for your particular requirements.

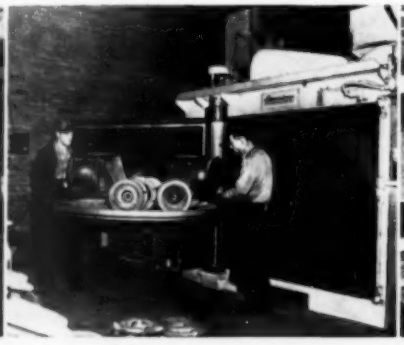
OTHER TYPES OF WHEELABRATOR EQUIPMENT AVAILABLE

UMBLAST **8 Sizes: 1 cu. t. to 63 cu. ft. capacity.**

SWING-TABLE **Sizes: 24", 48", 66", 72", 86" dia.**

MULTI-TABLE **5 Models: 8" to 66" dia. tables.**

PLAIN TABLE **Sizes: 6', 8', 10', 12' and 14' dia.**



Creative Engineers and Manufacturers Since 1908

American

WHEELABRATOR & EQUIPMENT CORP.

(Formerly American Foundry Equipment Co.)

505 S. Byrkit St., MISHAWAKA 2, INDIANA

MANUFACTURERS OF: Airless Wheelabrators; Airblast equipment; Wheelapeening; (Shot Peening) equipment; Dust Collectors; Sandcutters; Core Rod Straighteners.

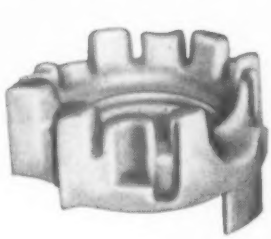
Sales Offices in Principal Cities

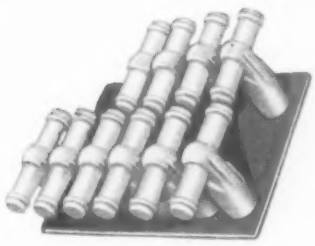
MODERN PRACTICES IN FOUNDRIES PAY DIVIDENDS!

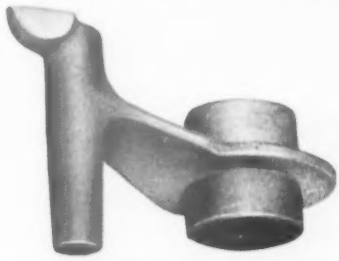
Certified's Foundry Specialist may be able to help you

SAVE PRECIOUS SHOP TIME!

Certified Core Oil Users get Real Help in Meeting Output Schedules







—and Cores made with Certified Core Oil are among the Finest Produced

HARD-TO-SOLVE problems in your operation arise daily. That's why we believe you'll like talking to the CERTIFIED CORE OIL REPRESENTATIVE . . . learning about the help he can give you.

He is not a "know-it-all" with a quick, stock solution to everything . . . but an experienced core foundry specialist who is more of a "helper" than a salesman. His "know-how" may be able to help you save previous shop time.

He is available to you just like a man "on your staff . . . but **not** on your payroll." Discuss your operations with him the next time he calls. See if he doesn't offer the kind of help that you can use.

A Foundry Specialist—
"ON YOUR STAFF—BUT NOT ON YOUR PAYROLL"
Your Certified Core Oil Representative

Call in the CERTIFIED MAN *to help recommend* the RIGHT CORE OIL FOR YOUR SHOP!

For best results a core oil should be "prescribed for the job." To get the right oil for your jobs, let the Certified man know...

- **OPERATING CONDITIONS**
- **TYPE OF SAND USED**
- **TYPE OF METAL CAST**

He will make the necessary tests and recommend the oil best suited for your shop practice.

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AGENTS AND REPRESENTATIVES: W. F. Hooper, Bloomfield, N. J. • Fred Shortsleeve Co., Elmira, N. Y. • John B. Hayes Co., Birmingham, Ala. • Handlan, Inc., St. Louis, Mo. • Thomas F. Gregg Co., Milwaukee, Wis. • Smith-Sharpe & Co., Minneapolis, Minn. • A. T. Lobel, Denver, Colo. La Grand Ind. Supply Co., Portland, Ore. • Ind. Foundry Supply Co., San Francisco, Calif. • Independent Foundry Supply Co., Los Angeles, Calif. • Edgar O. Stamm, Newtown, O. • J. and N. Yaeger, Chicago, Ill. • **WAREHOUSES:** Worcester Mass. • Reading, Pa. • Buffalo, N. Y. • Denver, Colo.

CORE OILS
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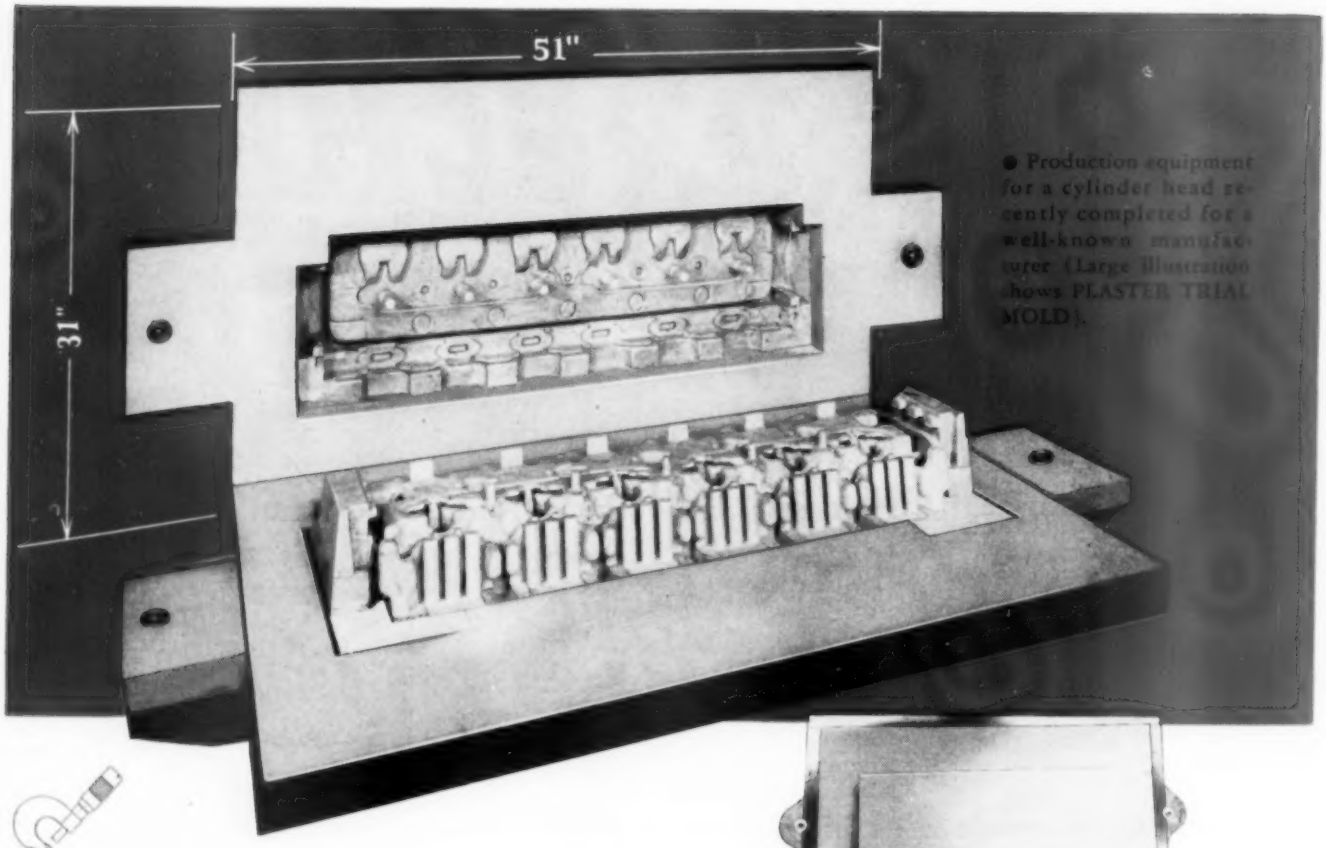
Another Buffalo PRECISION PATTERN



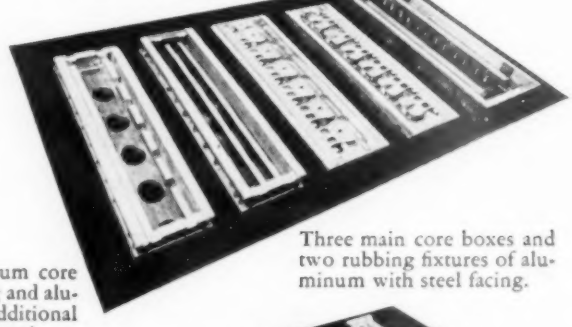
● Production equipment for a cylinder head recently completed for a well-known manufacturer (Large illustration shows PLASTER TRIAL MOLD).

accurate to THOUSANDTHS of an INCH

● Why is it that leading manufacturers of automotive, aircraft and diesel engines put their most intricate pattern making problems in the hands of Buffalo Pattern Works?

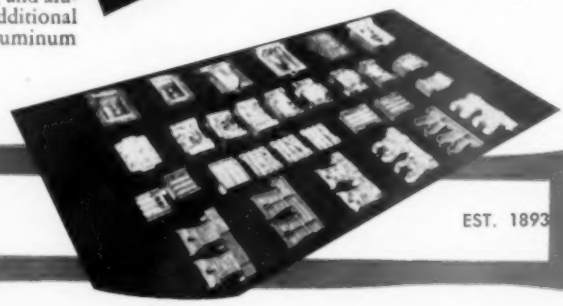
The simple answer is that these manufacturers have learned through the years that Buffalo can be relied upon for "true translations" of their blueprints. This means not only thousandths of an inch accuracy . . . but also metallurgical soundness which combine to make possible fast production of precision castings at lower cost. Consult Buffalo Patterns Works now. Write, wire or phone us, RIverside 3572.

Aluminum cope and drag with steel facing.



Three main core boxes and two rubbing fixtures of aluminum with steel facing.

Miscellaneous aluminum core boxes with steel facing and aluminum core dryers. Additional equipment includes aluminum core setting gauge to fit over flask pins (not shown here).



BUFFALO PATTERN WORKS
830 HERTEL AVENUE • BUFFALO 16, N. Y.
EST. 1893

(*Concluded from page* 134)
tention to the editorial "Keep that Membership in Your Trade Association," which appeared in the September issue of THE FOUNDRY.

Mr. Dean indicated that members of the Foundry Equipment Manufacturers Association account for approximately 80 per cent of the total of foundry equipment sales. A strong association provides the means for furthering the interests of both the foundry industry and the foundry equipment industry. Members benefit through the opportunity of knowing competitors and discussing common problems. Exceptional benefits also result through market surveys, credit reports, sales volume statistics, educational programs, etc. Mr. Dean stressed the importance not only of maintaining the present membership but of extending the benefits of the association to the entire industry.

William W. Maloney, secretary of the American Foundrymen's Association, outlined plans for the annual convention and the exhibition of foundry equipment and supplies to be held in Philadelphia, May 3 to 7, 1948. Mr. Maloney announced that shortly the board of directors of AFA would appoint an Exhibits Committee which, in addition to representatives of the association, will include members from the foundry equipment and supply industries.

At the close of the session, announcement was made that the following officers had been re-elected: President, Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind.; vice president, William L. Dean, vice president and general manager, Mathews Conveyer Co., Ellwood City, Pa.; executive secretary and treasurer, Arthur J. Tuscany, Arthur J. Tuscany Organization, Cleveland.

Elects Time Study Committee Chairman

Robert J. Fisher, supervisor of standards, Falk Corp., Milwaukee, has been named chairman of the Job Evaluation and Time Study Committee of the American Foundrymen's Association for 1947-48.

M. E. Annich, superintendent of standards, American Brake Shoe Co., Mahwah, N. J., is vice chairman and E. G. Tetzlaff, assistant to the secretary, Pelton Steel Casting Co., Milwaukee, is secretary.

Other members include W. E. George, account manager, Booz, Allen & Hamilton, Chicago; Harry Reitinger, senior industrial engineer, Emerson Engineers, New York; Herbert F. Scobie, Chicago, AFA educational director; M. T. Sell, standards and methods superintendent, Sterling Foundry Co., Wellington, O.; Dean Van Order, industrial engineer, Burnside Steel Foundry Co., Chicago; J. A. Westover, partner in Westover Engineers, Milwaukee and E. J. Williams, general manager of operations, American Chain & Cable Co., New York.

Book Review

Working With Aluminum, by Douglas B. Hobbs, cloth, 126 pages, 6 x 9 inches, published by Bruce Publishing Co., Milwaukee. Price $2.50.

Designed for the instructor, student and home craftsman in metalworking, this book contains 25 useful projects which involve basic metalworking processes, such as sawing, bending, scroll forming, hand hammering, casting, machining and spinning. Projects have been arranged so that as the worker progresses, greater ingenuity and skill are required. In each, a bill of material is included with dimensions and description of the raw material. First section of 43 pages is devoted to brief, clear cut descriptions of the various processes involved in the various projects which follow.

National Founders Plan Meeting

Annual meeting of the National Founders Association will be held at the Waldorf-Astoria, New York, Nov. 6-7. A variety of topics will be discussed in the talks scheduled for the two-day program, including labor relations problems, health and safety in the foundry, foundry administration and education, and business-government relationships. The first meeting will start at 10 a.m., Thursday, Nov. 6.

Among the scheduled speakers are James H. Smith, General Motors Corp.; Bruce Simpson, National Engineering Co.; H. J. Post, National Association of Foremen; Copeland Gray, National Labor Relations Board; George Hodge, International Harvester Co.; the Hon. Fred A. Hartley Jr. and the Hon. Homer Capehart.

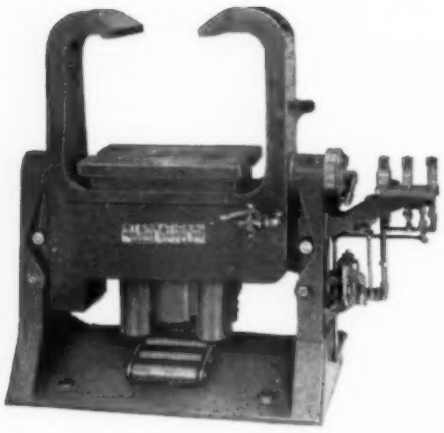
Hamilton Awards Service Pins

ON SEPT. 11, the 56th anniversary of Hamilton Foundry & Machine Co., Hamilton, O., 75 employees attended the service pin award dinner and received service pins denoting 5, 10, 15, 20, 25, years of service with the company.

The 20 employees at the 25-year table received an additional award of a Hamilton wrist watch as a result of a new policy inaugurated this year. Joining the "old timers" at the 25-year table receiving 25-year pins and wrist watches were Ben Karr, Andrew Henry, Richard Glomb and Peter Rawls.

Shown above, left to right, are: John Nickel, 43 years of service; George Feyh, 47 years; Donald McDaniel, vice president, 29 years; Ben Karr 25 years; Peter E. Rentshler, president, 27 years; Richard Glomb, 25 years; Andrew Henry, 25 years and Harold Roesch, 40 years.

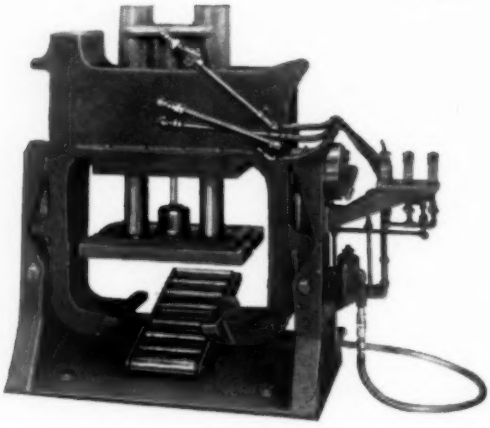
INTERNATIONAL
MOLDING MACHINES



Type REJ

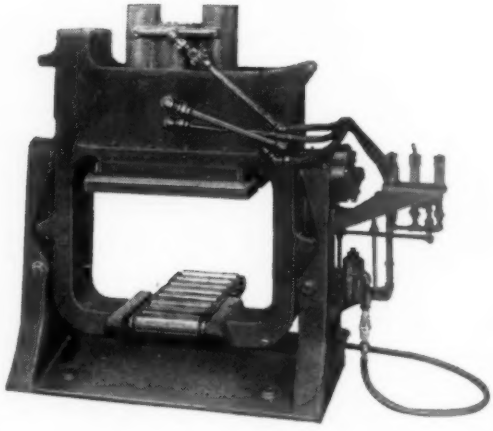
A New **JAR ROLLOVER DRAW MACHINE using the principle of Double Jolt Cylinders and Pistons. INTERNATIONAL has developed another new machine for the advanced foundrymen.**

With INTERNATIONALS the principle of Double Jolt Sections tied together has been in practice for over 10 years.



● The development of even ramming of mold...no ram-off... sand packing to top of flasks (with upset of required height.)

No squeeze needed... fewer Jolts. The Jolt Pistons act as Clamping Cylinders ... and as draw guides when drawing. A compact unit for the making of drags.



INTERNATIONAL MOLDING

Now in our New Plant:

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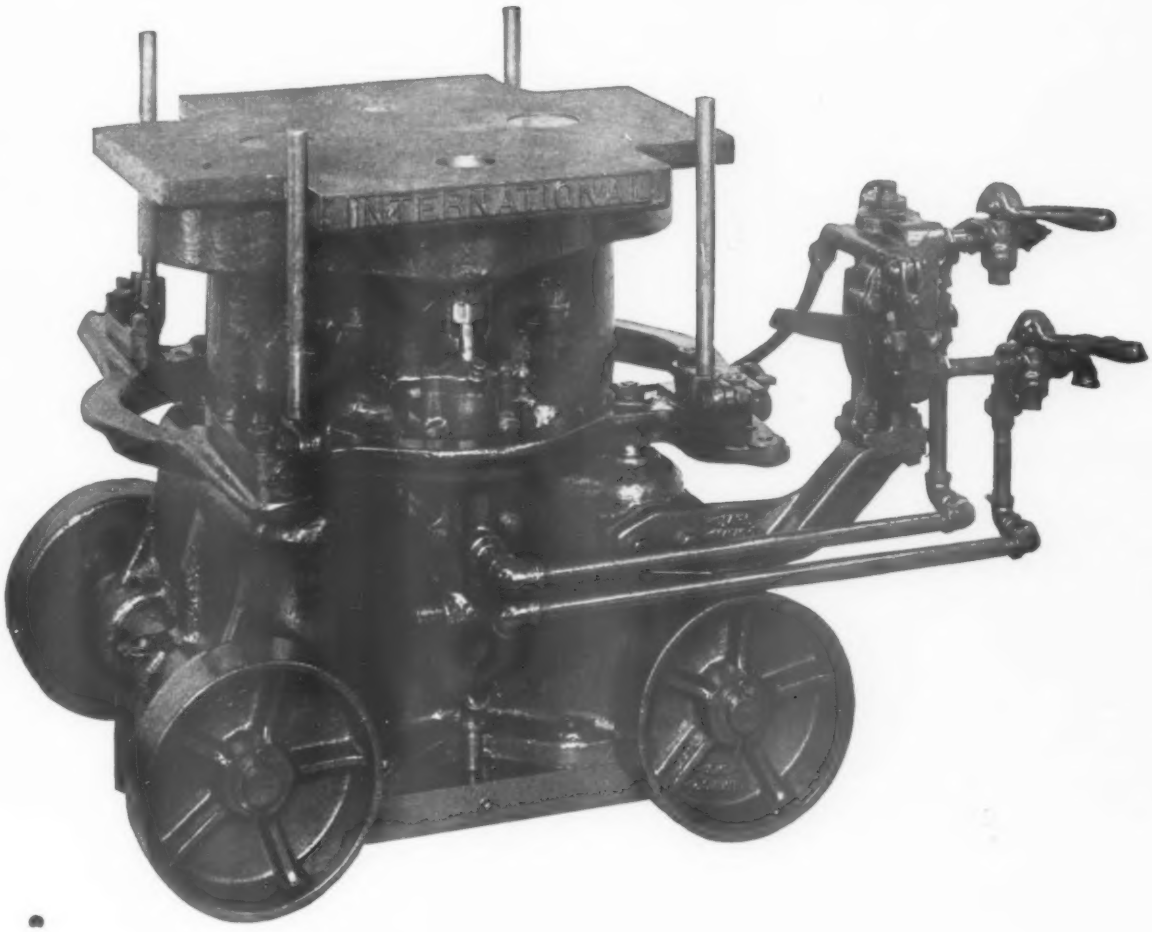
MOLDING MACHINES
Type JDP



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LA GRANGE PARK, ILLINOIS SUBURB OF CHICAGO

USE OF
Exothermic Cores

In Pouring Stainless Steel

By MAURICE BEAM

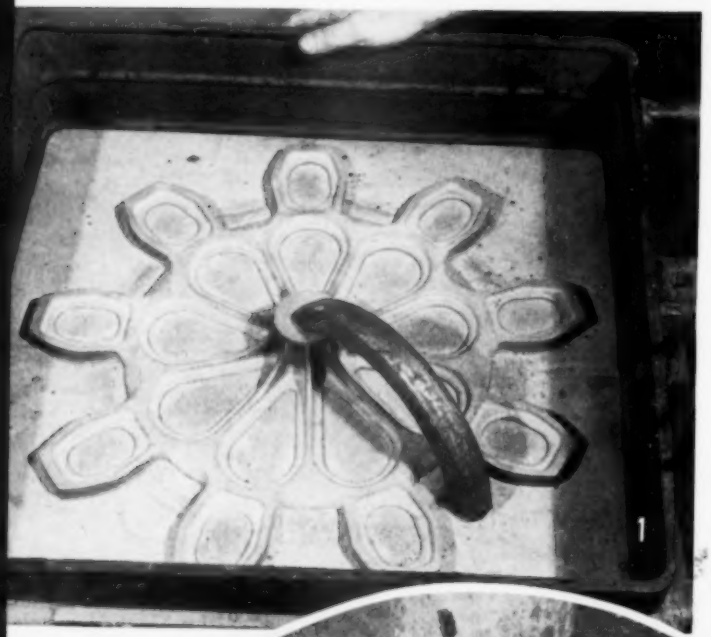


Fig. 1 — Sprocket pattern with horn gate in place

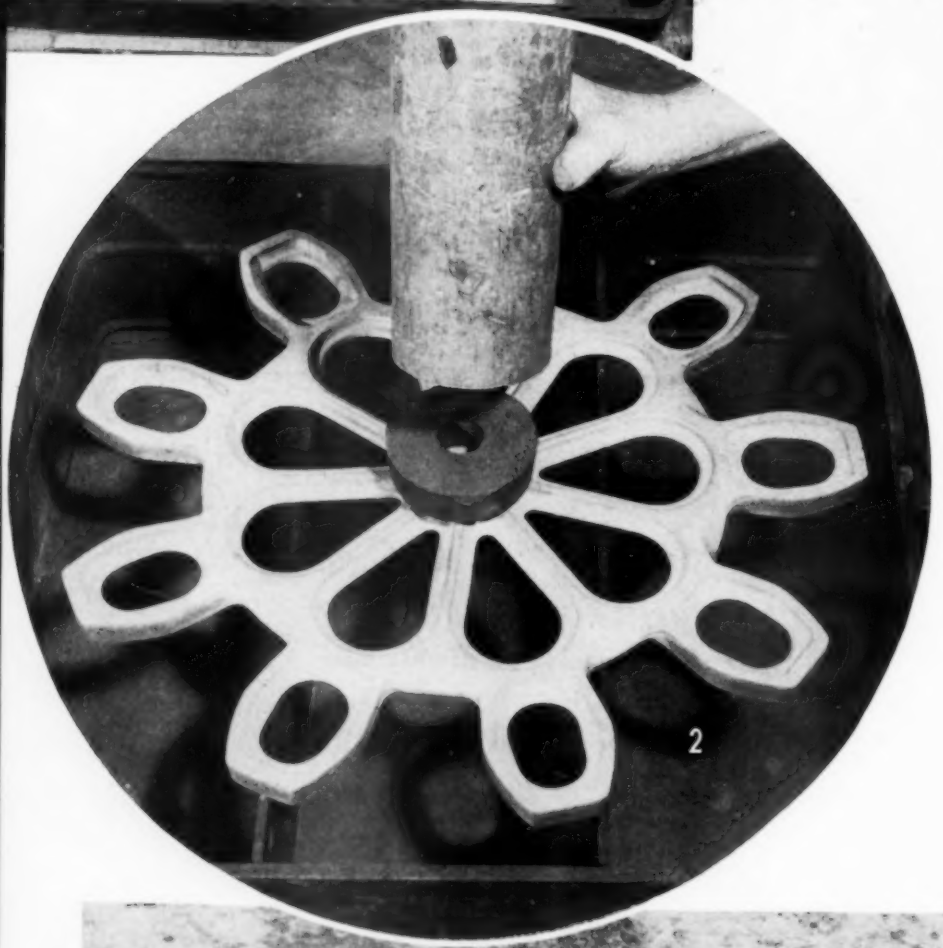


Fig. 2 — Reverse view of sprocket pattern

Fig. 3—Tube support pattern

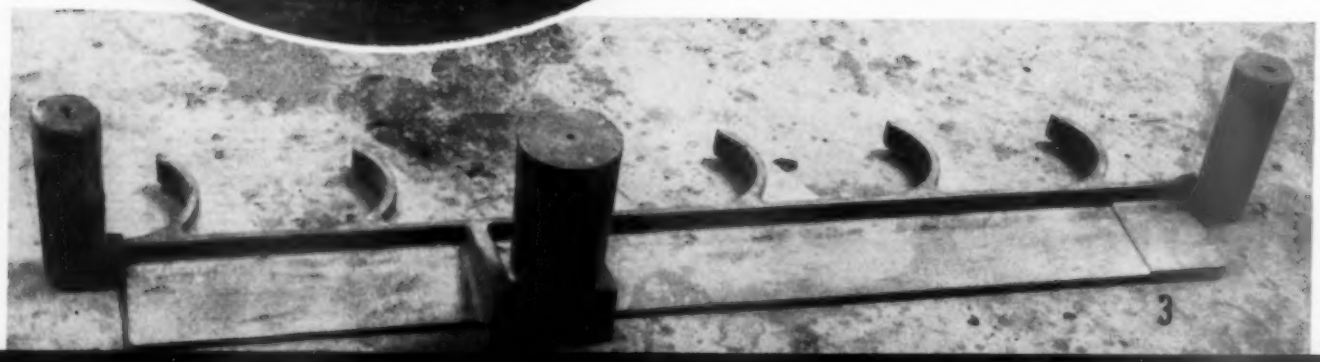
USE of exothermic material has been adopted successfully by the Induction Electric Foundry, Los Angeles, in the production of stainless steel and other types of heat and corrosion resistant castings. Accompanying illustrations show how the material is applied as a means of promoting adequate feeding of the castings.

The pattern shown in Figs. 1 and 2 is for a sprocket casting used in food processing machinery. More than 50 of these sprockets were made without a single scrap casting. The casting was fed through a horn gate leading to the sprocket hub in the drag, as indicated in Fig. 1, which shows the pattern on the follow board with the gate in place. Fig. 2 shows the reverse side of the pattern and illustrates the exothermic ring insert which was placed at the base of the riser. When the casting is poured the insert develops a temperature of 3500° F or more; this helps to maintain the metal in the riser fluid and assist in subsequent feeding until the casting has solidified. The small diameter of the opening through the insert also simplifies later removal of the riser.

Fig. 3 shows a pattern for a tube support casting, and indicates the position of exothermic cores in relation to the risers at both ends. A third core is partly hidden under the largest riser at the center.

Cores employed in casting a stainless steel rotor are shown in Fig. 5, the main or body core being at the right, and the cover core at the left. Assembled cores ready for pouring are illustrated in Fig. 4, and, as may be surmised, the mold cavity is filled by pouring directly into the hub through a runner box. To prevent the entrance of any dirt, and to aid in removal of the combination gate

(*Concluded on page* 142)



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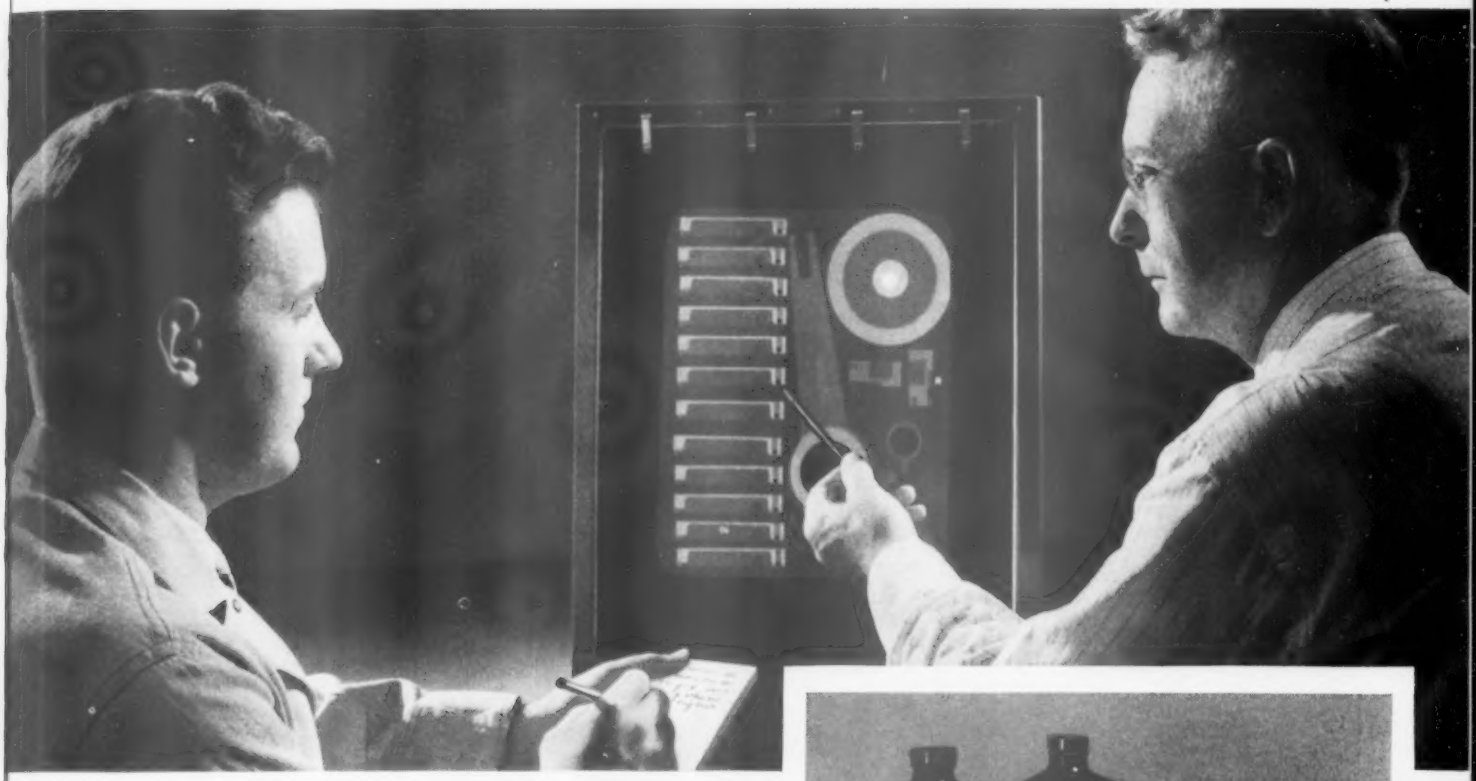

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EASTMAN KODAK COMPANY X-ray Division, Rochester 4, N. Y.

Kodak

(*Concluded from page* 140)

and riser, a strainer core is placed in the sprue opening. The strainer core also serves a third purpose. It is made with exothermic material, and the heat generated in contact with molten metal insures keeping the metal fluid until feeding is completed.

In addition to exothermic cores or ring inserts placed under feeding heads the company also places an exothermic powder compound on the tops of the risers immediately after filling the mold. This compound reacts to generate additional heat which maintains the metal in a highly fluid state so that feeding of the casting continues during solidification —the riser being the last to freeze. It also might be mentioned here that as a general rule the molten metal coming up in the riser generally is colder than that poured into the gate, and the exothermic material adds sufficient heat to raise it as high or higher than the entering metal.

A pattern with conventional type risers as received by the foundry is shown in Fig. 7. As may be observed, each casting has two risers, one at each end, and the casting is gated from the riser at the right. In the foreground is one of the risers after burning off, and indicates the large area of attachment. Fig. 8 shows the same pattern with changes made to incorporate the use of exothermic ring inserts between risers and castings. Foreground shows one of the risers and a ring insert. Riser indicates clearly the small area of attachment, and comparison of Figs. 7 and 8 illustrates the reduction possible in the connection between riser and casting.

Another instance of application of exothermic material to overcome a production problem was that of making a casting in which two heavy sections were connected by a comparatively light section. By ramming up a thickness of exothermic material in the portion of the mold forming the thinner section, it was possible to gate into one heavy section and maintain a suitable feed across the thinner section into the other heavy section without any difficulty.

Some experimenting was necessary to determine the proper size of exothermic core for each job as well as the proper hole or connection size. The material is molded into the desired form of core or ring insert and then baked in a manner similar to that employed for dry-sand cores. This permits them to be handled readily for insertion in molds.

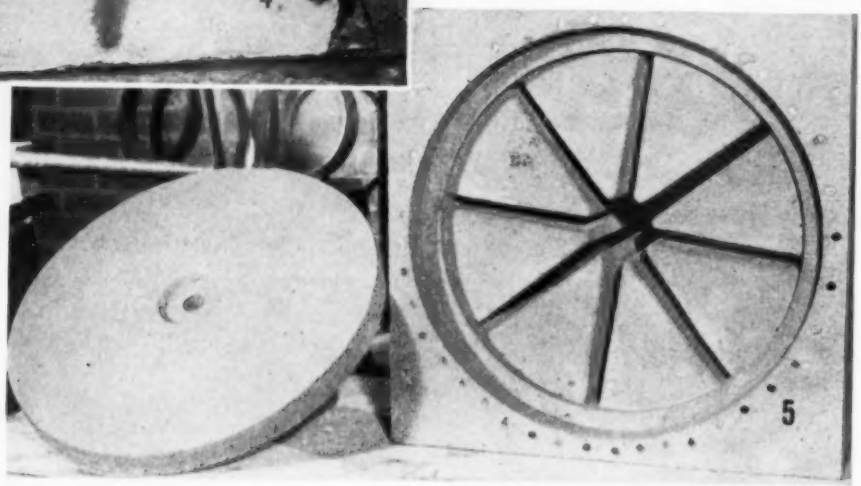


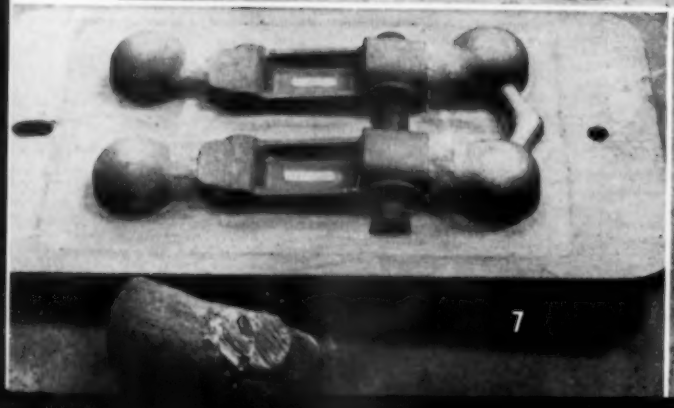
Fig. 4—Assembled rotor cores

Fig. 5—Rotor cover core, left; body core, right

Fig. 6—Staff of Induction Electric Foundry

Fig. 7—Pattern with conventional risers

Fig. 8—Same pattern as in Fig. 7, adapted to exothermic ring inserts



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That's why more and more foundrymen are specifying "Norton" for their small wheels as well as their large. They are finding that the same Norton savings which show up in the cost records for swing frame and floor stand wheels can be realized on their small grinders, too.

You'll find Norton wheels available in the most convenient sizes and shapes for all portable grinders, large or small—and in the correct specifications for various types of metal. Most of them are in stock with your Norton distributor or at the nearest Norton warehouse.

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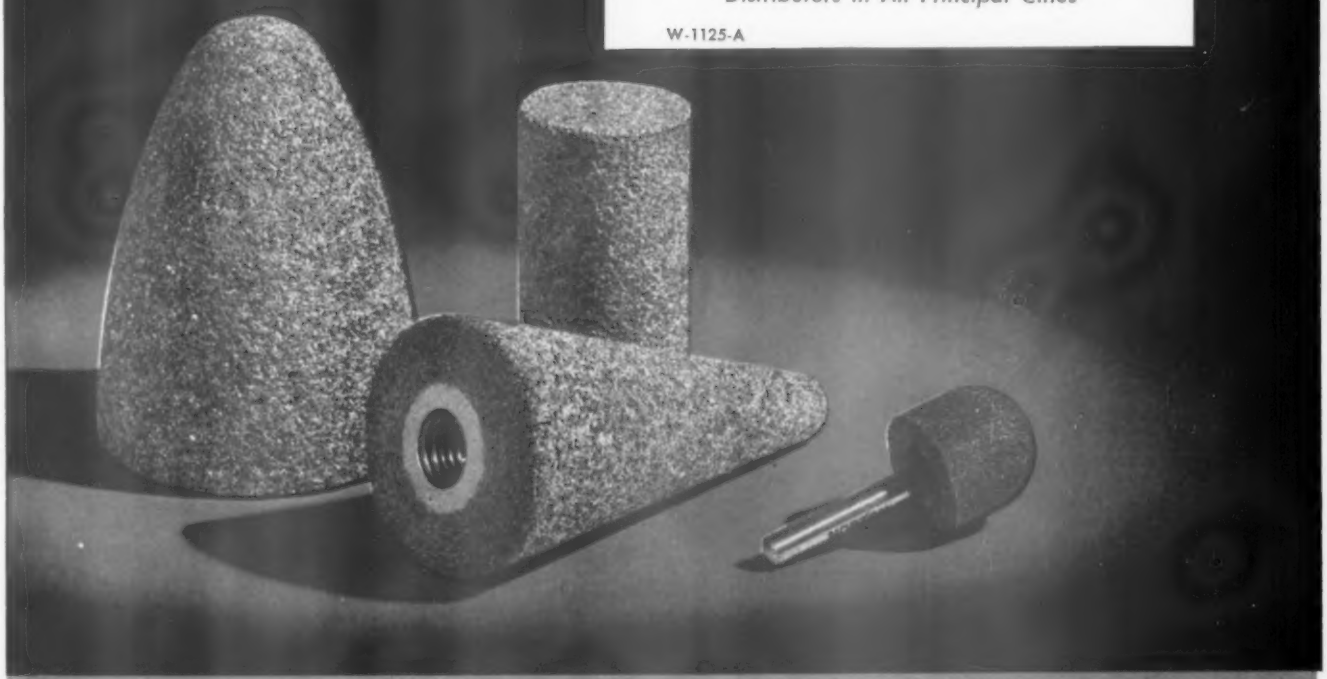

NORTON ABRASIVES

T. M. REG. U. S. PAT. OFF.

GRAY IRON FOUNDERS ANNUAL MEETING

(*Continued from page* 91)

the pig iron shortage. Inventories were low at the war's conclusion, and the rapidity of reconversion gave little opportunity to build up stocks. Strikes in 1946 caused the loss of more than a million tons of pig iron. Inferior quality of coke is causing an estimated 8 per cent loss in pig iron production. Pig iron consumers are operating at exceptionally high rates and in many instances have attempted to turn from scrap to pig iron because of scarcity and high price of the former. Continued scarcity of scrap naturally tends to accentuate the pig iron shortage. The heavy steelmaking rate requires a large tonnage of cast iron in the form of ingot molds. Imported pig iron has been of little assistance in the shortage, receipts of foreign iron the first seven months this year totaling only 16,000 tons. Incidentally, exports during the same period were only 7000 tons, mostly to Canada.

According to Mr. Stephenson, pig iron supply can be expected to continue short so long as production of rolled steel and castings are held near their current levels.

Foundry coke production this year is at an all-time high rate, it was stated by Samuel Weiss, executive secretary, American Coke & Coal Chemicals Institute, Washington, in discussing the outlook for that fuel.

DR. A. P. HAAKE — H. L. TIGGES — E. C. BARRINGER — B. A. KRAWCZYK

SPEAKERS at the annual meeting of the Gray Iron Founders' Society included, left to right: Dr. Alfred P. Haake, Chicago economist; Herbert L. Tigges, vice president and sales manager, Baker Bros. Inc., Toledo, O.; Edwin C. Barringer, executive secretary, Institute of Scrap Iron & Steel Inc., Washington, and B. A. Krawczyk, supervisor, compensation department, Allis-Chalmers Mfg. Co., Milwaukee

If the recent rate is continued, 1947 output will total about 3,869,000 tons, compared with the former peak of 3,861,000 tons in 1918.

Quality of coke admittedly has slipped, according to Mr. Weiss, who added that while some improvement may be expected as additional coal cleaning facilities are provided, it is unlikely that we shall ever get back to the quality available prior to 1935. The reason is that we have skimmed the cream from the supply of good coking coal, and the coke produced today reflects the poorer quality of coal available to oven operators. This matter of quality also tends to make coke scarcer; in 1946, for instance, blast furnaces required an average of 1868 pounds of coke to produce a ton of pig iron, compared with only 1745 pounds per ton in 1941.

The scrap industry hopes to get through the winter without any shutdowns of steel mills or foundries, but it is going to be a tight squeeze, according to Edwin C. Barringer, executive secretary, Institute of Scrap Iron & Steel, Washington, who discussed the cast scrap outlook. He pointed out that the supply of cast iron scrap for foundry cupolas is particularly dependent upon the factor of obsolescence. This means that the cast scrap potentially available from automobile graveyards, farms and railroads will not move to market

(*Continued on page* 147)

View of concluding luncheon session at annual meeting of Gray Iron Founders' Society

VOLCLAY BENTONITE

NEWS LETTER No. 21

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

CASTING DEFECTS...BLOWS

When lava from a volcano cools, the mass becomes too viscous to allow the steam and expanded gases to escape, and thus when it cools it becomes a honeycombed slag.

The same is true when molten metal solidifies.

If the metal imprisons gases, blows result. If the gas force is sufficient to blow through the molten metal surface, external holes develop. If not, internal porosity develops.

Blows are usually recognized by smooth, slightly discolored depressions on the outer surface of the casting or by rounded or oblong holes through the wall of the casting.

Blows may appear as large gas pockets on the cope side, or in heavy sections above improperly vented pockets or recesses.

Usual causes:

FLASKS--Lack of vent holes in flasks or bottom boards.

GATING--Sprue head too low.

MOLDING--Hard ramming. Pockets not properly vented. Incorrect mold spray.

MOLDING SAND--Too much moisture. LOW PERMEABILITY. Seacoal or organic material too high (if gray iron or malleable; if steel, the cereal may be too high). Green compression strength too high. Too many fines. Sand heap may be saturated with clay balls. Too much new sand. Density too high. Gas pressure high.

CORES--Under baked. Too much oil or binder. Moisture too high. Tight cores that are improperly vented. Excess gas in materials used. Cores that have a glazed surface. Misfit cores that allow the metal to run into the vents.

MOLDER--''Sleeking'' mold surface with trowel or molder's tools. Excess water used to patch with the sponge or swab.

OTHERS--Rusty chaplets. Wet chaplets. Improperly coated nails. Chaplets with high lead content instead of tin or made from terneplate instead of tinplate. Chills that are rusty, uncoated, cold, wet or improperly coated.

To guard against blows, insure proper permeability by using less bond. Add no more than 4%-5% Volclay or Panther Creek Bentonite as the bonding ingredient. DON'T CLOSE THE BASE SAND BY ADDING LARGE AMOUNTS OF WEAK AND INFERIOR BONDS.

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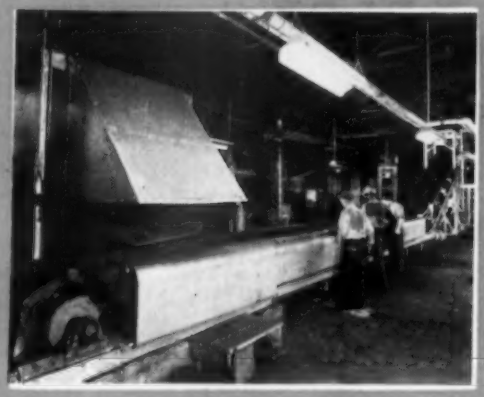

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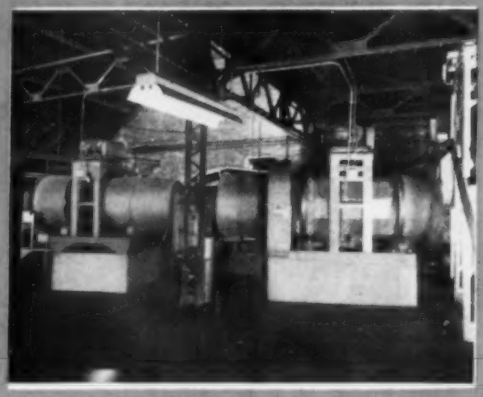

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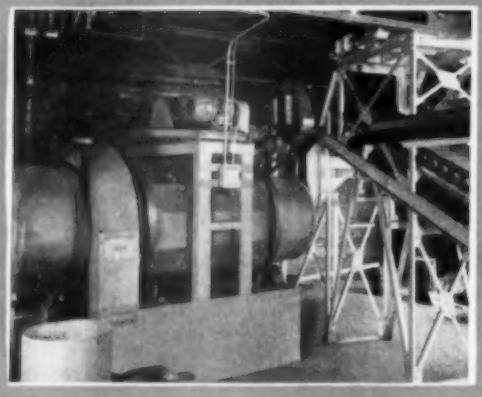

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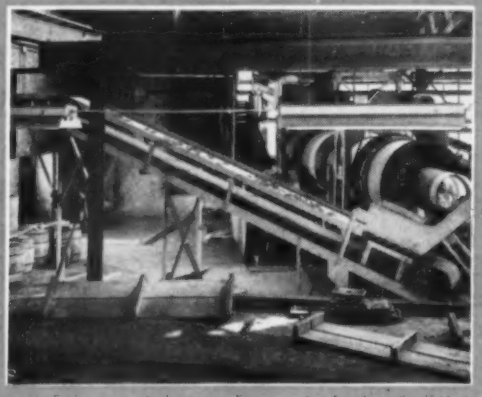

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NO MANUAL HANDLING BETWEEN POURING AND INSPECTION

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AUTOMATIC STAR-RETURN

The RANSOHOFF End-loading, End-unloading Wet Mill is cleaning and despruing hard iron malleable castings prior to inspection and anneal. It is equipped with time switch to make entire process automatic.

(1) Work comes from shake-out

(2) Into mill for cleaning

(3) Into feeding and holding drum from which it is fed to

(4) Conveyor and then through the wall to

(5) Inspecting and Sorting

And note this, too:
No dust . . . no rust . . . no breakage . . . no nicking . . . no dust-collecting systems . . . no excessive mill wear.

Save 30% to 70% ON YOUR CLEANING COSTS

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SEND US A SAMPLE BATCH FOR FREE TESTS AND REPORTS

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President

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Secretary

(*Continued from page* 144)
until a sufficient volume of new automobiles, agricultural implements and rolling stock is provided. Demolition of antiquated factories and scrapping of obsolete machine tools and other equipment also are influenced largely by obsolescence.

Time is on the side of an increase in the supply of scrap, Mr. Barringer said. Barring some international emergency, it is inevitable that the supply of new manufactured products will increase, and in turn contribute to the generation of scrap, although the process will be a slow one.

Speaking at a luncheon meeting on the subject "The Need for Better Selling Today," Herbert L. Tigges, vice president and sales manager, Baker Bros. Inc., Toledo, O., said that what is needed is creative selling—the type that creates a want as yet unrecognized. The urgency to reduce costs can be met in part by the foundry industry through development of casting designs which require a minimum of machining operations, he added.

Various important provisions of the Taft-Hartley Act were explained at one business session by John Lovett, general manager, Michigan Manufacturers' Association, Detroit. Mr. Lovett stated that surveys have shown that the majority of workers approve individual provisions which make up the act but have been led through adverse propaganda to oppose the act as a whole. However, he declared that laws are not the solution to labor relations problems; what is needed is an attitude of fairness in both the front office and shop. As a basis for effective labor relations management should furnish capable supervision, efficient tools and good working conditions. Mr. Lovett recommended employment of a labor relations manager for plants of 100 or more employees.

RAYMOND L. COLLIER
Executive Vice President

WILLIAM M. CALDWELL
Assistant Executive Vice President

Unemployment compensation payments offer an important incentive to employers to stabilize employment, it was pointed out by B. A. Krawczyk, supervisor, compensation department, Allis-Chalmers Mfg. Co., Milwaukee. He cited various instances of substantial savings effected through lower tax rates which accompany elimination of peaks and valleys in payrolls. In addition, relatively steady employment reduces the cost of hiring and training new workers and curtails the amount of spoiled work caused by new employees.

Interest in employment stabilization waned during the war, the speaker said, but industry should begin now to study the subject; it may be too late to do so when supply again meets demand. Foundries are dependent for their orders on the demand for manufactured articles, but some steps can be taken to level off employment. Mr. Krawczyk recommended care in the scheduling of orders to permit steadier operations; also the search for and development of new products. He urged foundry organizations to collect and disseminate information on the subject of employment stabilization.

Although the general rise in prices and the foreign situation are disturbing factors in the general business outlook, no immediate depression is in prospect, it was stated by Dr. Alfred P. Haake, Chicago economist, who spoke at the concluding luncheon session. Factors which might be expected to lead to a depression are not now at work, he added. Prices are likely to go still higher, the speaker indicated, because production has not increased in proportion to the upturn in wages.

(*Concluded on page* 150)

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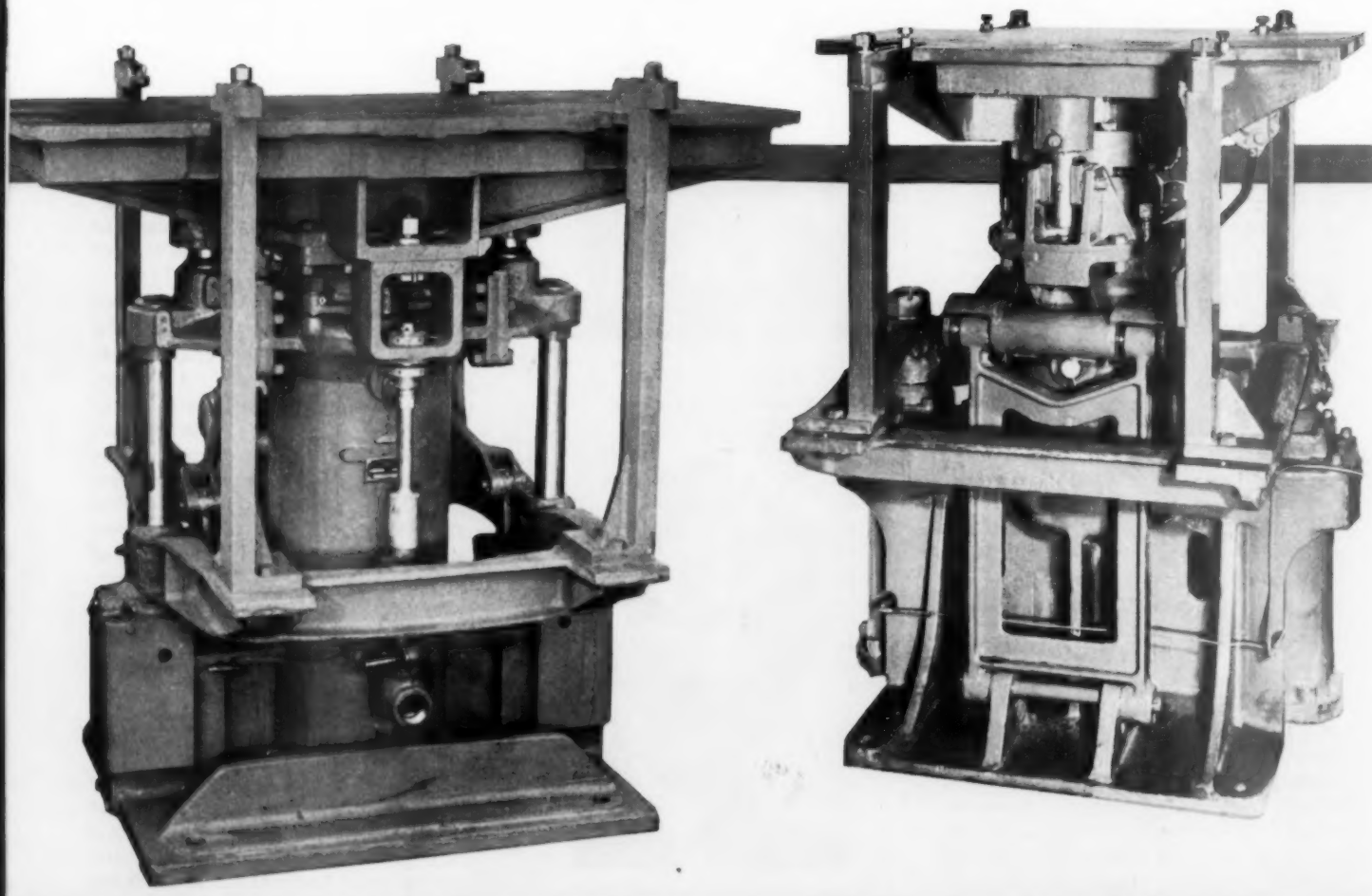
LIFT PIN ADJUSTMENT...



THE OSBORN MANUFACTURING COMPANY
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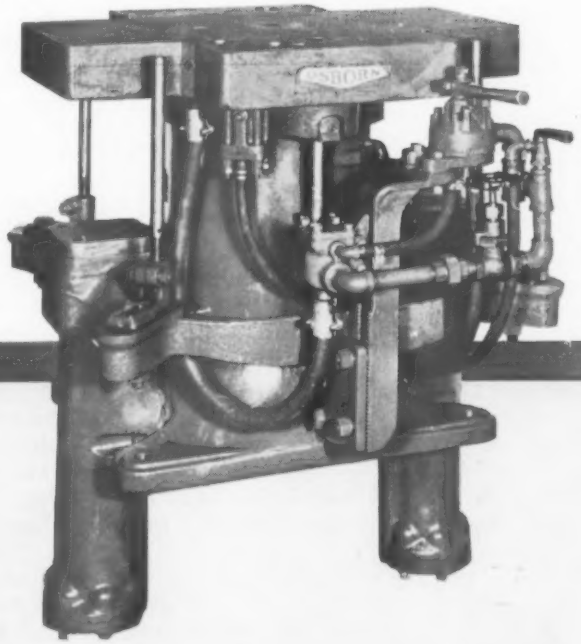
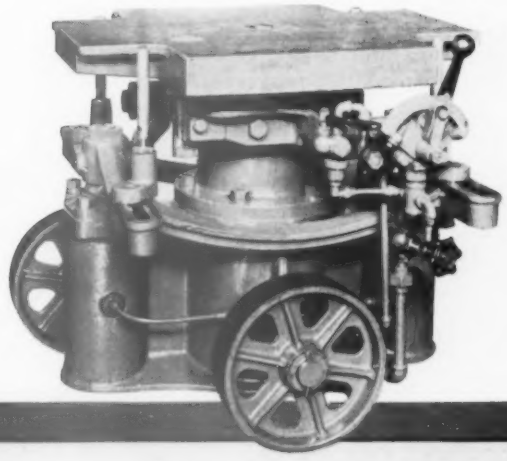
S FEATURE *Above-the-floor*





You pay no penalty for size when you select a unit from Osborn's complete line of jolt strippers. Whether it is a small portable unit or a large machine requiring pit type foundation, the convenient flexibility of the above-the-floor lift pin adjustment assures quick handling of a wide range of flask sizes.

OSBORN

MOULDING MACHINES

CORE BLOWING MACHINES

MEMBER MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

SHELDON P. PUFAHL HERMANN P. GOOD J. E. I'ANSON

DIRECTORS elected at the Gray Iron Founders' Society's annual meeting included, left to right: Sheldon P. Pufahl, Pufahl Foundry Inc., Minneapolis; Hermann P. Good, Textile Machine Works, Reading, Pa., and J. E. I'Anson, Lincoln Foundry Corp., Los Angeles. Other directors chosen were Howard A. Stockwell, Barbour Stockwell Co., Cambridge, Mass.; R. E. Kucher, Olympic Foundry Co., Seattle; Henry J. Trenkamp, Ohio Foundry Co., Cleveland, and George F. Hutchins II, Standard Foundry Co., Worcester, Mass.

(*Concluded from page* 147)

An enjoyable buffet supper, followed by entertainment, was held Thursday evening, this also being part of the special program provided for the ladies during the two-day meeting. The convention entertainment committee, headed by E. L. Roth, Motor Castings Co., Milwaukee, also included George Gilson, J. E. Gilson Co., Port Washington, Wis.; William J. Grede, Grede Foundries Inc., Milwaukee; E. Mrkvicka, Standard Foundry Co., Racine, Wis.; W. R. Tanner, Zenith Foundry Co., West Allis, Wis.; A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis. George E. Tisdale, Zenith Foundry Co., served as general convention chairman, while the ladies' entertainment committee consisted of Mrs. W. R. Tanner, Mrs. William J. Grede, Mrs. R. L. Lee, Mrs. E. L. Roth and Mrs. A. C. Ziebell.

The next annual meeting of the Gray Iron Founders' Society has been scheduled for Oct. 14-15, 1948, at Haddon Hall, Atlantic City.

CONFERENCE: Eighty-nine of the key personnel of the Robinson Clay Products Co., Akron, O., manufacturers of vitrified products, refractories, pottery, glass and china, were honored with service pin awards at a three-day general conference during September. A feature of the conference was the unveiling of a length of vitrified clay pipe that represented the 200 millionth mile of Robinson clay pipe produced in its 91 years. In the picture above, W. E. Robinson, company president, is shown stamping a length of pipe with the company shield

AFA Nominating Committee Named

American Foundrymen's Association has chosen its 1948 nominating committee, with Past President Sheldon V. Wood, president-general manager, Minneapolis Electric Steel Castings Co., chairman of the nine-man group. Fred J. Walls, Detroit office manager, International Nickel Co. AFA president during 1945-46, also serves on the committee.

Other members, their chapters and the section of the castings industry with which they are associated, are: William M. Ball Jr., foundry superintendent, Magnus Brass Division, National Lead Co., Cincinnati Chapter, brass and bronze; Robert R. Haley, owner, Advance Aluminum & Brass Co., Los Angeles, Southern California Chapter, aluminum and magnesium; Russell F. Lincoln, president, Russell F. Lincoln & Co., Cleveland, Northeastern Ohio Chapter, equipment and supplies.

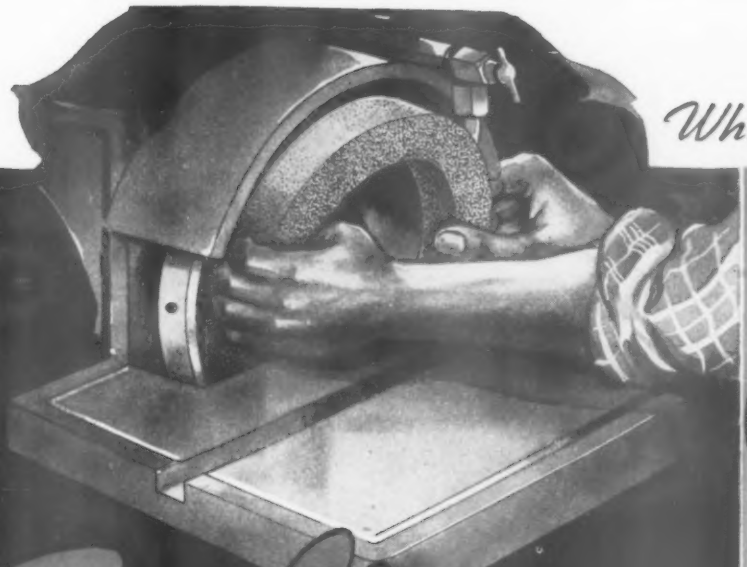
Also, Henry B. Hanley, foundry manager, American Laundry Machinery Co., Rochester, N. Y., Rochester Chapter and Lloyd D. Wright, superintendent, U. S. Radiator Corp., Geneva, N. Y., Central New York Chapter, gray iron; L. Edward Roby, superintendent, Peoria Malleable Castings Co., Peoria, Ill., Central Illinois Chapter and Earl M. Strick, finishing superintendent, Erie Malleable Iron Co., Erie, Pa., Northwestern Pennsylvania Chapter, malleable iron.

Candidates for president and vice president for 1948-49 and for five three-year directorships will be named by the nominating group. Elections will be held at AFA's annual business meeting during the 52nd annual convention, Philadelphia, May 3-7.

Manual on Aluminum

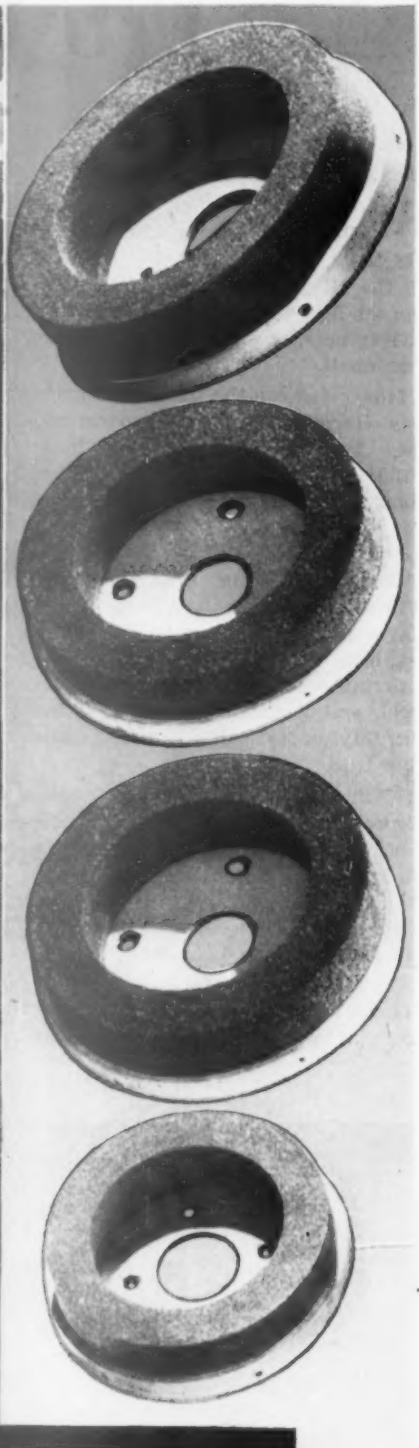
Aluminum Research Institute, 111 West Washington St., Chicago 2, just has published a 78-page booklet entitled "Manual of Aluminum Casting Alloys." Based on co-operative research in member-laboratories and a program sponsored at Case Institute of Technology, the book is divided into two parts. The first on physical and mechanical properties of smelters' aluminum casting alloys gives tables and data on those for sand casting and for permanent mold casting. Second part is a general discussion of aluminum ingot alloys which contains information on foundry melting and pouring practices for sand permanent mold castings.

"The Wheels Of Industry"



Sterling

EASYMOUNTS



STERLING Easymounts and Wheels remove all guesswork from tungsten carbide tool grinding, together with drill and high speed tool bit sharpening. They provide a simple, removable feature for wheel replacement.

There are Easymounts for adapting to your machine, from 5" to 14" in diameter, with wheels for roughing, semi-finishing, or finishing operations.

Easymounts and Wheels are available for Willeys, Sellers, Heald, Excello, Baldor, Hammond, Oliver, Delta, Prosser, Criterion, Blount, Sundstrand, Bura-Way, and others.

There is the safety, rigidity and performance you have always desired in the Sterling Easymount and Wheel . . . write for full information. Find out how easily you can enjoy this economy!

Send for the Easymount Folder!

A COMPLETE description of the Sterling Easymount and Wheel is contained in this attractive, two-color folder, recently released. Lists and describes all sizes and gives prices. Ask for your copy; it will be sent at once!

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OF THE CLEVELAND QUARRIES COMPANY
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THE WHEELS OF INDUSTRY

Activities of Foundry GROUPS

Cincinnati

RIGGING and Equipment for a Particular Type Foundry" was the topic discussed by six speakers at the Sept. 8 meeting of the Cincinnati District Chapter of the AFA at Engineering Society Headquarters, Cincinnati.

Moderator for the discussion group was Herman K. Ewig, superintendent, Foundry Division, Cincinnati Milling Machine Co. Walter Klayer, plant manager, Aluminum Industries Co., represented aluminum foundries; Howard Pierson, industrial engineer, Williamson Heater Co., cast iron; William Ball Jr., superintendent, Magnus Brass Division, National Lead Co., brass; Henry McFarland, foundry superintendent, Lunkenheimer Co., steel, and Arthur Grim, superintendent, Dayton Malleable Iron Co., malleable iron.

Each speaker presented a short resume on the subject, describing rigging, tooling and pricing practice in their respective foundries. After their talk they answered questions which applied to their particular branch of the foundry industry.

Overall theme of the talks indicated that although there was a great variance in procedure in different foundries, the end result was the same—namely, attainment of the most economical setup.—*C. H. Fredricks, Cincinnati Milling Machine Co.*

Eastern Canada and Newfoundland

EASTERN Township and Regional Conference was held Sept 12-13 by Eastern Canada and Newfoundland Chapter of the AFA at the new Sherbrooke Hotel, Sherbrooke, Quebec.

Under the chairmanship of A. E. Cartwright of Montreal and G. M. Young of Sherbrooke a successful program was presented. Afternoon plant visits to various foundries were arranged, followed by a cocktail party and dinner. Speaker at the dinner was N. J. Dunbeck, vice president, Eastern Clay Products Inc., Jackson, O. His topic was "How to Select a Bond Clay."

Saturday morning there were two simultaneous technical group sessions. G. D. Turnbull, vice president, Shawinigan Foundries Ltd., was chairman of the iron session. The speakers were E. N. Delahunt, general superintendent, Warden King Ltd., and S. Morse, assistant foundry superintendent, Ingersoll-Rand Co. Mr. Delahunt's subject covered various phases of cupola operation. Mr. Morse spoke on "The melting of Cast Iron in the Electric Furnace."

The steel session was held under the chairmanship of Robert Stott, Canadian Car & Foundry Co. Ltd., Speakers were W. T. Shute and R. T. Thompson. Mr. Shute's talk on "Determination of Risers for Steel Castings" was illustrated with slides and graphs. Mr. Thompson talked on "Alloy Additions for Steel Castings and Their Problems." Lively and interesting discussion followed the talks.

A golf tournament was held at North Hatley, and golf prizes were donated by the Sherbrooke industries.

Conference committees were: Eastern Township committee—G. M. Young, chairman; R. Neville, E. E. Fisette, E. F. Patton, W. Legare and J. Kinsella. Chairman of the Montreal committee was James Newman. Others on the committee were L. Voisard, J. Grieve, J. Moore, M. A. Hughes, F. Clark, W. Seeds, S. Williams, J. McVey, W. Nuttall, P. Savoie, A. Lewis and J. Hunt—*H. E. Francis, Jenkins Bros. Ltd.*

Wisconsin

MONTHLY dinner meeting of the Wisconsin Chapter of the AFA was held Oct. 10 at the Hotel Schroeder, Milwaukee, with 284 attending. After dinner the members adjourned to separate rooms for five sectional discussions.

The Gray Iron group heard L. D. Pridmore, International Molding Machine Co., on the subject of "Core Blowing." John V. Olle, Motor Castings Co., Miwaukee, was chairman of the section, with 130 in the audience.

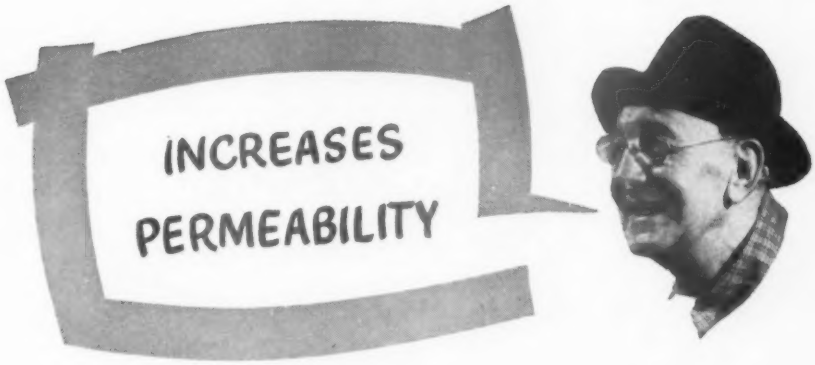
The Malleable group, with 30 attending, saw an interesting motion picture entitled "Production of Melting Coal," followed by a round-table discussion on melting coal and melting in general as employed in a malleable iron plant. The discussion leader for this section was Albert Krerzewski, general sales manager for the Milwaukee Western Division of Northwest Hanna Coal Co.

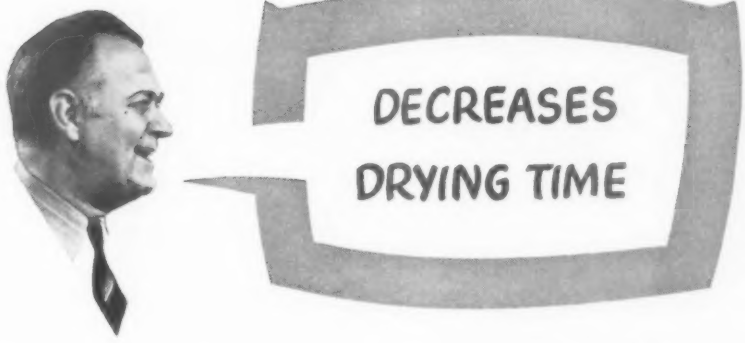
Thirty-five members listened to three speakers for the nonferrous group on the subject of "New Developments in Modern Melting Methods." The speakers were E. J. Geittman, Lindberg Engineering Co.; C. M. Norlin, Kuhlman Electric Co. and J. C. Smith, Strohman Furnace & Engineering Co. The chairman for this group was John L. Kammermayer, Federated Metals Division.

The Pattern group heard a talk on

(*Continued on page* 155)

CINCINNATI: Speakers who participated in the group discussion at the Sept. 8 meeting of the Cincinnati District Chapter, AFA. Left to right, they are: Herman Ewig, Cincinnati Milling Machine Co.; Howard Pierson, Williamson Heater Co.; Walter Klayer, Aluminum Industries Co.; Arthur Grim, Dayton Malleable Iron Co., William Ball Jr., National Lead Co., and Henry McFarland, Lunkenheimer





Foundry management, watching mounting costs, sees profits in MOGUL. This perfect Green Bond makes money because it decreases drying time, yields smooth cores and reduces discards. MOGUL works profitably with pitch or resin because cores can be handled warm. For both green and dry strength use MOGUL in cores.

KORDEK is an equally perfect Dry Bond. Used in smaller quantities than most dry binders, KORDEK produces better quality castings with fewer discards.

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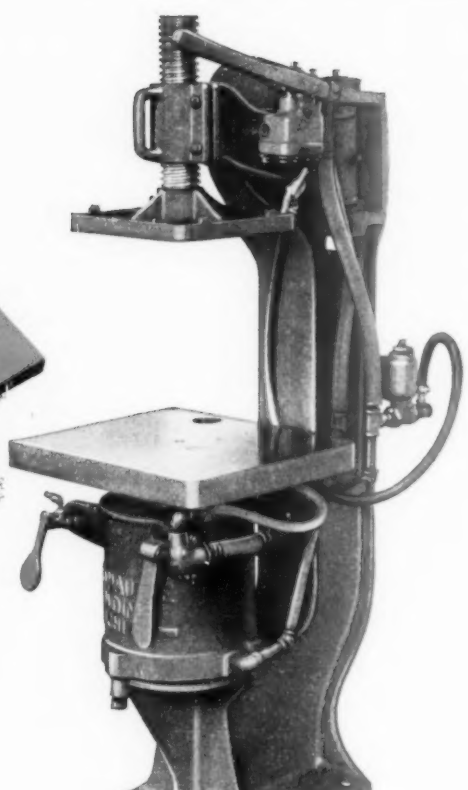


● (Above) No. 103 Stationary Jolt Squeezer with 10" squeezing piston. Accessible from 3 sides.

(Right) No. 124 Portable Jolt Squeezer with 12" squeezing piston, steel wheels, mold shelf.

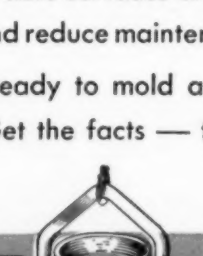
The future of your foundry depends largely on the type of equipment you use. Are your machines modern and efficient? Do they reduce costs to rock bottom? Will they stand up under strenuous production schedules?

Foundrymen employing MILWAUKEE Jolt Squeezers face the future with confidence. For these dependable molding machines are built for rugged service and are easy to operate. Designed to maintain the original parallelism between platen and table, there is no need to worry about ram-offs. The machine produces BETTER MOLDS in LESS TIME. Upkeep is low because renewable surfaces are provided at wearing points to simplify and reduce maintenance.

Yes Sir! Milwaukee Molders are ready to mold a prosperous future for your foundry. Get the facts — today!

NEW BENCH TYPE CORE BLOWER

Have you investigated the new MILWAUKEE-TACCONE Core Blower? It's designed to blow more intricate cores, as fast as the operator can remove them from the core box. Write for facts.



MILWAUKEE *Foundry Equipment Co.*

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(*Continued from page* 152)

"Engineered Patterns and Castings" by Robert Hendry, of Beloit, Wis., with 45 in the audience. A. M. Fischer, Jurack Pattern Works, Milwaukee, was chairman for this group, with Harry Arneson, Spring City Pattern Works, co-chairman.

"Special Refractories for the Foundry" was the subject of a talk, with slides, by William H. Owen, of Harbison-Walker Refractories Co., with 49 in the audience. O. H. Kraft, Bucyrus-Erie Co., acted as chairman for this group. As the special refractories made by Harbison-Walker to take the place of sand cores made by individual foundries, are novel, many questions were directed at the speaker after the talk. Shipments of this product were begun only recently, the speaker said, although it was the subject of long experiment in actual practice. At least for the present, the refractories are being used only with steel castings. One of the principal advantages in the use of refractory cores, Mr. Owen stated, is the absence of moisture.—*John E. Hubel.*

Central Indiana

APPROXIMATELY 325 Indiana foundrymen attended the fifth annual stag outing and picnic of the Central Indiana Chapter of the American Foundrymen's Association, held Sept. 20 at the Lake Shore Country Club, Indianapolis. The affair lasting all day, was acclaimed by William Ziegelmuller, chapter chairman, as one of the finest meetings in the history of the group.

A golf tourney, baseball game and horseshoe contests were featured events on the program which concluded with chicken dinner and awarding of door and athletic prizes.

A. E. Murphy, Hickman, Williams & Co., planned and directed the outing as chairman of the picnic committee. He was assisted by committee members Ralph Thompson, Electric Steel Castings Co., Indianapolis; A. W. Anderson and J. P. Lentz, both of the International Harvester Co.'s Indianapolis plant, and B. P. Mulcahy, foundry consultant, Indianapolis.— *W. K. Mitchell.*

Texas

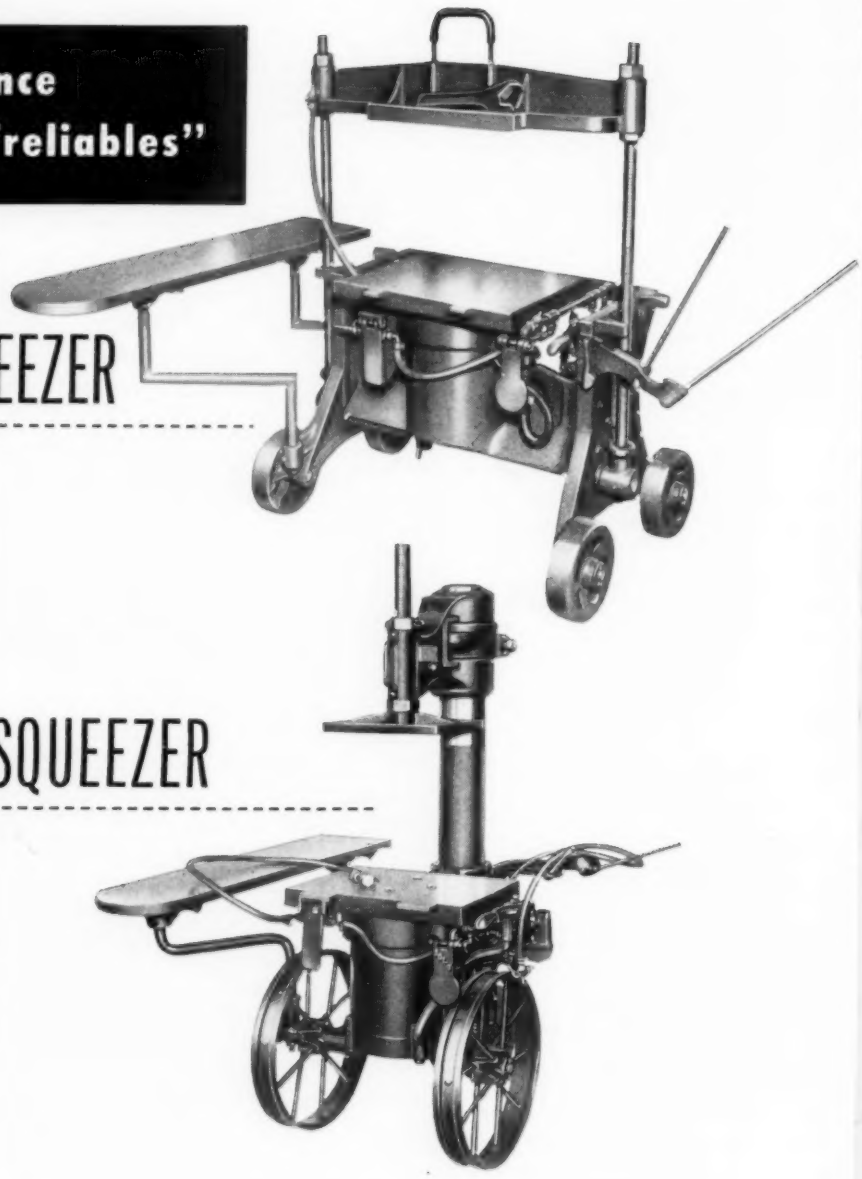
A paper on nonferrous operating suggestions was presented by H. L. Smith, chief metallurgist, Federated Metals Division, American Smelting & Refining Co., before the Texas Chapter of the AFA at its meeting Sept. 19 at Texas State Hotel, Houston, Tex.

Mr. Smith presented a simplified and direct explanation of the phenomenon of gassing in melting and casting nonferrous alloys. He pointed out that if the maximum possible amount of hydrogen and oxygen are absorbed in 1000 lb of a nonferrous alloy melted in an oil-fired or gas-fired furnace and poured at a temperature of 2050 to 2075° F, sufficient hydrogen and oxygen are contained to form 22 gallons of water, or if these gases could exist as water vapor, the total volume of metal plus gas would

(*Continued on page* 160)

CENTRAL INDIANA Chapter members gathered for their fifth annual stag outing Sept. 20

practical experience produced these "reliables"



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It's an important point:

Arcade is both a ***manufacturer and user*** of molding machinery—knows foundry needs, builds good machines to meet those needs.

Now in development at Arcade is a full line of molding machines to meet the needs of every size and type of foundry.

It's a good idea—and a good time—to talk to Arcade.

ARCADE

MANUFACTURING DIVISION

ROCKWELL MANUFACTURING COMPANY

FREEPORT, ILLINOIS

(*Continued from page* 155)
be two and one-half times the volume of the metal alone.

Precautions must be taken to prevent the absorption of hydrogen and its subsequent reaction with oxygen to form water vapor. The amount of hydrogen which is soluble in the metal depends upon three things: Atmospheric pressure, the head of metal in the crucible, and the surface tension of the metal.

To eliminate gas present in the metal, a small quantity of zinc should be added before pouring, by plunging the metal to the bottom of the crucible, thus allowing the zinc vapor to flush the bath. The flushing action will be helped by keeping the surface broken by the skimmer. The vapor pressure of the zinc is sufficient to overcome the above factors, which hold the gas in the metal.

Mr. Smith went on to say that if, after these and other precautions have been taken, the operator still obtains gassing in the mold, it is possible that the molding sand is too impermeable, too wet or both. He suggested that a dry sand test bar be poured at some time between the melt and the green sand castings operations, which will determine whether or not gassing was caused by furnace procedure or molding technique.—*W. H. Lyne, Hughes Tool Co.*

Wisconsin

WISCONSIN Chapter of the AFA held its first dinner meeting of the year at Schroeder Hotel, Sept. 12, with 312 present. After the dinner, the group divided into sections to hear different speakers. A joint meeting was held by the gray iron, technical and malleable iron groups, with 168 in the audience. George Antonic, Walter Gerlinger Inc., Milwaukee, spoke on chemically treated foundry sand. Discussions from the floor followed his talk.

In another room of the hotel, 64 members of the steel group met and heard W. F. Sherman, International Harvester Co., Chicago, discuss "Supervision's Place in a Grievance Procedure." A lively discussion followed his talk.

The nonferrous group, with 41 present, listened to W. C. Shirley, chief metallurgist for U. S. Reduction Co., East Chicago, Ind., on the subject of "Why Should I use an Aluminum Casting?"

Steve Denkinger, Atlas Pattern Works, Butler, Wis., addressed 39 members of the pattern group on "Advancement in Plastic Pattern Technique." This subject proved to be an interesting one, as evidenced by the discussion from the floor after the talk.—*John E. Hubel*

Canton

HORSEBACK riding, buggy rides, a coach and sulky added much to the usual merriment of the annual picnic of the Canton District Chapter of the AFA held Aug. 23 at the farm home of Otis D. Clay, Tuscora Foundry Sand Co., Canal Fulton, and chapter treasurer.

Almost 100 members and friends enjoyed Mr. Clay's hospitality during the afternoon and evening.—*Nils E. Moore, Wadsworth Testing Laboratory.*

Central Michigan

OPENING fall meeting of the Central Michigan Chapter of the AFA was held Sept. 30, at the Post Cereal Club House, Battle Creek. Douglas Strong, who was elected chairman of the new chapter in May, 1947, announced that members would receive a slate of new officers for the coming year, and would cast ballots by mail.

R. G. McElwee, foundry manager, Vanadium Corp. of America, Detroit, was guest speaker and devoted his talk to "Specifications and How To Meet Them Today with Special Reference to Engineering Irons." Opening his discussion by covering factors involved in building a specification for an iron, Mr. McElwee then described practical operating conditions in foundry melting practice that must be carefully controlled to maintain the specification. He pointed out that an iron specification is more difficult to develop than one for steel because no element added to iron has a single effect. Silicon, for example, softens iron to a certain point but further increases in silicon will tend to harden it.

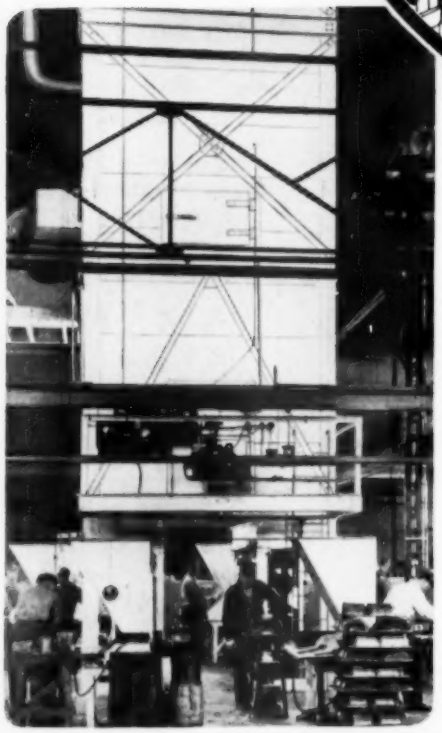
The speaker maintained that most foundries use too much silicon in their irons. He strongly recommended melting of irons on the "hard side" and then softening them by the use of inoculation at the furnace spout or ladle. He mentioned that this practice has been proved to give more versatility in physical properties as well as a considerable saving in money. In clinching this point Mr. McElwee stated that silicon used as an inoculant is about three times as potent as when used in the furnace charge.

When a specification for an iron is developed, the next important step is

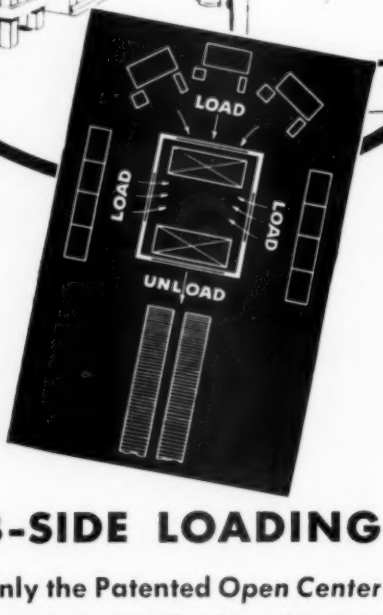
(*Continued on page* 160)

CANTON District Chapter of the AFA at its annual picnic, Aug. 23. Photos courtesy Massillon Steel Castings Co., Massillon, O.

Why it Pays to install



Coleman Tower Oven in Mid-West Gray Iron Foundry.



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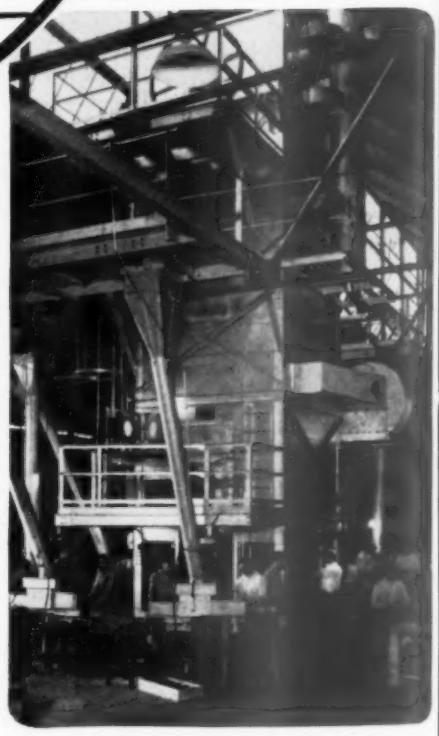
Only the Patented *Open Center* makes possible the efficient grouping of coremakers around 3 sides of the Tower and increases loading accessibility up to 300% compared with ordinary vertical oven design.



One of Several Coleman Tower Ovens in Leading Malleable and Steel Foundry.

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COLEMAN *Tower Ovens*

To get the most out of modern continuous baking with vertical core ovens, you must have the advantages offered by the exclusive features of Coleman Tower Ovens.

Fast Loading. Patented Open Center makes them by far the fastest loading vertical ovens built.

Perfect Baking at Amazing Speeds. Perfect core baking eliminates rejects and make-overs.

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Better Working Conditions. With the cores cooled and "smoked-off" before unloading there are no acrid fumes or gases nor uncomfortable heat in the core department. Better conditions increase output.

Large Output from Small Floor Space. In Coleman Tower Ovens all the baking is done overhead, giving you large core-baking capacity from very little floor space.

These and Many Other Features are responsible for the wonderful record of performance of Coleman Tower Core Ovens in outstanding foundries producing all types of castings.

Coleman Ovens are also built in all conventional and special designs to meet every possible requirement in core baking and mold drying. Heating systems can be furnished to use the most economical fuel available in your locality—gas, oil, electricity, powdered coal, stoker coal, etc.

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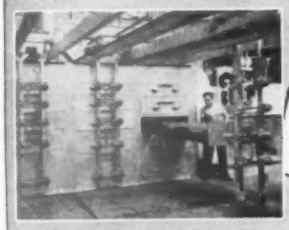
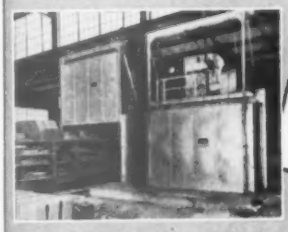
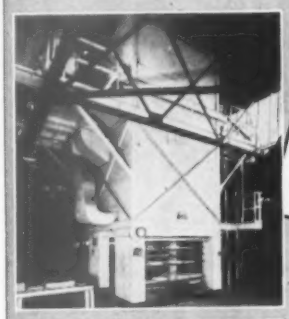
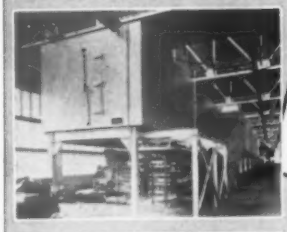
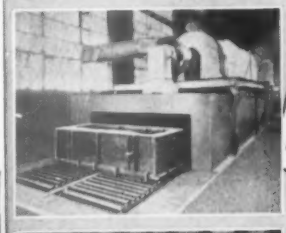

COLEMAN Rolling Drawer Ovens

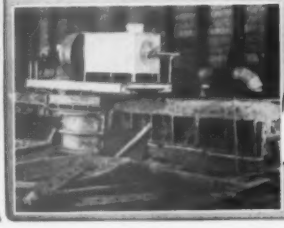
COLEMAN Transrack Ovens


COLEMAN Car Type Ovens


COLEMAN Tower Ovens


COLEMAN Horizontal Conveyor Ovens


COLEMAN Conveyor Mold Ovens


COLEMAN Portable Mold Dryers

Y EQUIPMENT *Company*
13, OHIO, U. S. A.
AN AND SWARTWOUT OVENS

MEMBER

(*Continued from page* 157)
to make periodic checks of the analysis to make sure that the chemical composition is being held within the proper limits. The practice of checking the analysis of one furnace tap was considered inadequate and Mr. McElwee advised that at least occasionally an analysis should be made of every furnace tap, during the day, to get a complete story of the uniformity of the metal. A lively question and answer period followed the speaker's talk.—*C. C. Sigerfoos, Michigan State College.*

Southern California

FIRST fall meeting of the Southern California Chapter of the AFA was held at Roger Young Auditorium, Los Angeles, Sept. 12. Technical speaker of the evening was John Francis Drake, Kennard & Drake metallurgical consulting firm. He spoke on "The Laboratory and Your Foundry."

Mr. Drake stated cast iron could be made to a specific design by using careful chemical control. He stressed the importance of having a good chemical laboratory and making use of this control out in the foundry. By co-ordinating the chemical control with foundry practice, he pointed out, the customer was more apt to get an iron that would machine satisfactorily.

He also pointed out that too much inoculant can spoil a good iron and ruin it for the purpose intended. The correct amount of inoculation should be determined by careful testing and observation and working the problem out with the aid of the laboratory.

Mr. Drake outlined information he considers essential to the proper running of a plant where molten metal is handled: A basic knowledge of the melting unit, regular and reliable laboratory information and adequate records.

He added that the best job in iron foundries is done by plants which do not have too many different section sizes to run. However, he said that it is possible to change from running high carbon equivalent irons to low carbon equivalent irons daily only if close laboratory control over the iron is maintained.

Captain Marshall of the Los Angeles Air Corps Procurement office gave an interesting coffee talk on "Industrial Preparedness." He emphasized the importance of continuing active research and development during peacetime. He also stated the foundry industry would be expected to produce at a much greater rate than during the recent war, should another emergency occur.—*Ralph N. Schaper, Westlectric Castings Inc.*

SOUTHERN CALIFORNIA: Views of members and guests of Southern California Chapter of the AFA who participated in the activities at the chapter's outing Aug. 9

Chicago

CHICAGO Chapter of the AFA initiated its 1947-48 season with a round-table meeting on Oct. 6. The chapter is continuing to hold its dinners and meetings at the Chicago Bar Association where facilities are excellent.

Members and guests of the chapter to a total of 225 attended and participated in the four discussion groups sponsored by the Gray Iron, Malleable Pattern, Nonferrous and Steel divisions. Chapter President Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, presided at the dinner, and was assisted in getting the group sessions under way by Vice President Chester K. Faunt, works manager, Christensen & Olsen Foundry Co., Chicago. The latter also is chairman of the program committee.

Gray Iron division session had for its subject "Sensible Foundry Control," with Fred Snyder, engineer, Hickman, Williams & Co., Indianapolis, as the speaker. James Wilkins, superintendent of foundry, Hurley Machine Division, Electric Household Utilities Corp., Chicago, was chairman.

"Correlation Between Pattern Shop and Foundry" was the subject of a roundtable sponsored jointly by the Malleable and Pattern divisions. H. K. Swanson, owner, Swanson Pattern & Model Works, East Chicago, Ind., was the speaker, and W. D. McMillan, metallurgist, International Harvester Co., Chicago, presided.

H. R. Youngkrantz, metallurgist, Apex Smelting Co., Chicago, ad-

(*Concluded on page* 164)

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FEATHERWEIGHT FLASKS

formerly made by American Foundry Equipment Co.

returns to the trade via the

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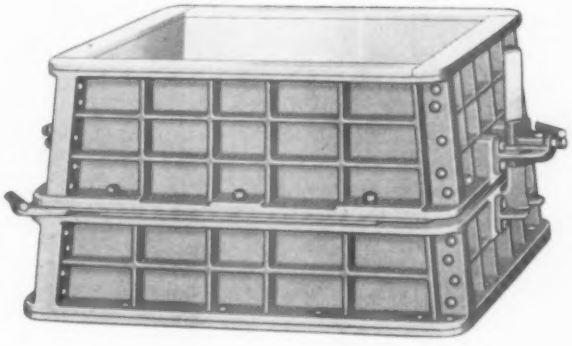

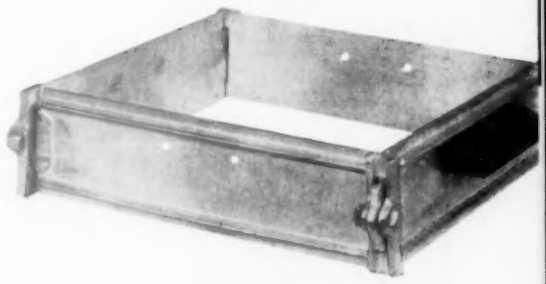

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CORES SHIPPED ANYWHERE—SEND US YOUR INQUIRIES

BIRMINGHAM Chapter members of the AFA at their fourteenth annual outing, Sept. 20, at Roebuck Country Club

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Fills an Important Foundry Need

For 43 Years Pangborn has met this need-- *with constantly improved Room designs*

Among the features that make Pangborn Air Blast Rooms efficient and economical investments are:

- "Daybright" Electric Light Fixtures—*give evenly diffused illumination.*
- Latchless, self-closing, self-sealing adjustable doors—*are free from interference of floor litter.*
- "Down-draft" ventilating ducts—*give maximum visibility—minimum dust around operator.*

For complete data —

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(*Concluded from page* 160)
dressed the Nonferrous division session on "Aluminum Fluxes." Chairman was Martin G. Dietl, metallurgist, Crane Co., Chicago.

Subject for the Steel division meeting was "Causes for Scabs, Buckles and Spalls on Steel Castings," and proved a most interesting one with J. B. Caine, metallurgist, Sawbrook Steel Castings Co., Lockland, O., as the speaker. Walter W. Moore, superintendent, Burnside Steel Foundry Co., Chicago, served as chairman.

Next meeting of the chapter will be on Nov. 3 and will be National Officers' night. National AFA President Max Kunianski, vice president, Lynchburg Foundry Co., Lynchburg, Va., and other national officers will be guests of honor. Technical speaker on this occasion will be Thomas W. Curry, metallurgist, Lynchburg Foundry Co., who will discuss "New Process for Chemically Treated Molding Sands."—*Erle F. Ross.*

Quad City

ABOUT 125 members and guests attended the dinner and technical session of the Quad City Chapter of the AFA held at Fort Armstrong Hotel, Rock Island, Ill., Sept. 15. W. B. McFerrin, metallurgical engineer, Electro Metallurgical Co., Detroit, spoke on "Cupola Operation." H. Bornstein, Deere & Co., led a lively discussion which followed the talk.—*C. R. Marthens, Marthens Co., Moline, Ill.*

Birmingham

ONE of the best outings ever sponsored by the Birmingham Chapter of the AFA was held Sept. 20 at Roebuck Country Club, Birmingham. A total of 656 members and guests attended this 14th annual outing and were served a delicious barbecue dinner.

D. C. McMahen, Harbison-Walker Refractories Co., was general chairman of the entertainment committee which included J. E. Getzen, Harry G. Mouat Co.; Lipscomb Carl, Sloss-Sheffield Steel & Iron Co.; Gene Welchel, American Cast Iron Pipe Co.; Herman Mattison, De Bardeleben Coal Corp.; Morris Hawkins, Stockham Pipe Fittings Co.; Charley B. Saunders, T. H. Benners & Co., and Guy Bagley, Woodward Iron Co.

The program included golf, swimming, softball, horseshoe pitching and other contests. Mr. Hawkins was master of ceremonies at the drawing for the prize which was won by R. P. Wunderlick, W. J. Bullock Co.

Best dressed man at the picnic was W. B. Neal, Gadsden Iron Works, and Arthur Johnson, American Cast Iron Pipe Co., was judged the biggest man in attendance.—*J. P. McClendon, Stockham Pipe Fittings Co.*

Northeastern Ohio

A GROUP of national officers attending the Oct. 9 meeting of the Northeastern Ohio Chapter of the AFA at the Cleveland Club, Cleveland, included Vice President W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh; W. W. Maloney, secretary-treasurer, and H. F. Scobie, educational director, national headquarters, Chicago, and E. N. Delahunt, general superintendent, Warden King Ltd., Montreal, a national director. Seats at the speaker's table also were occupied by Thomas Begg and Douglas Leishman, representing Metter's Ltd., Sydney, Australia, at present on a tour of inspection and observation through United States foundries.

Mr. Maloney discussed briefly the coming Philadelphia convention, May 3 to 7, 1948. Mr. Scobie outlined the procedure covering the preparation of papers designed to be presented at the convention. Mr. Wallis presented a resume of his recent tour of many European countries, and included observations on general conditions, social and industrial. In the speaker's opinion, while conditions by no means are back to normal, they are not quite as deplorable as the majority of published reports would seem to indicate.

Main address of the evening, under the title "Chemically Coated Sand," was delivered by Norman J. Dunbeck, vice president, Eastern Clay Products Co. Inc., Jackson, O. In an exceptionally interesting manner he dealt with practically every phase of this comparatively recent development in foundry practice. The new liquid plastic of rather low viscosity essentially is a resin dissolved in a solvent and is water soluble. Sand first is coated by mixing it with the plastic in an ordinary foundry mixer and then passing it through a rotary drier at 350° F. The resulting material is non-thermo setting and extremely refractory, will not fuse and will burn without any ash. The action is regulated by a catalyst in the coating.

At a separate meeting of the chapter's patternmaking division, J. J. Parker, SPO Inc., Cleveland, discussed the importance of good pattern equipment in operation of molding machines. George J. Gedeon, Aluminum Co. of America, presided. Mr. Parker described in detail the different types of commonly used molding machines and the pattern requirements of each. He indicated that a jobbing shop needs a good patternmaker—one who is adept at the proper mounting of patterns used in machine molding.—*Pat Dwyer.*

Metropolitan

CASTING defects and foundry sand practice was discussed by Clyde A. Sanders, American Colloid Co., Chicago, at the first fall meeting of the New York Metropolitan chapter of the AFA, at the Essex House, Newark,. N. J., Oct. 6. He commented on such defects as cuts and washers, sand blows, rat tails, etc., and on the effects of bonding clays in various types of sands. He illustrated his remarks with lantern slides.

Kenneth A. De Long, International Nickel Co., presided for the first time as the new chairman of the chapter, and John Van Haver, Worthington Pump & Machinery Corp., Harrison, N. J., served as technical chairman. Approximately 120 were present.—*Ben K. Price.*

Meetings Arranged By ASTM

The 1948 committee week and spring meeting of the American Society for Testing Materials will be held in Washington during the week of Mar. 1 to 5, while the annual meeting of the society will be held in Detroit during the week of June 21 to 25 in conjunction with the eighth exhibit of testing apparatus and related equipment. Headquarters will be at the Book-Cadillac Hotel. While official announcement has not yet been made, it is quite definite that the 1949 annual meeting will be in Atlantic City with the likelihood that the committee week and spring meeting for that year will be in Chicago during the week of Feb. 28 to Mar. 4.

Offers Wall Chart

A colorful, illustrated wall chart listing DO's and DON'T's for handling and melting aluminum in foundries is offered by Federated Metals Division, American Smelting & Refining Co. A copy of the 16 x 21 in. poster, printed on heavy varnished paper and weighted top and bottom, may be had by writing to the company at 120 Broadway, New York 5, Dept. SJ.

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Edco Dowmetal

BOTTOM BOARDS

--so DURABLE they can be considered *Permanent Equipment*

The revolutionary new EDCO DOWMETAL Bottom Boards have so many advantages over anything previously known that they are finding immediate acceptance in foundries throughout the country.

These boards are made of *magnesium*. They are even lighter in weight than wood, and possess incredible resistance to heat. They will not warp or break, and normal "run-outs" and "spills" of molten metal will not harm them. There are no nails to come loose, nothing to break or split.

EDCO DOWMETAL Bottom Boards may be considered permanent foundry equipment because of their durability under most foundry conditions.

You will find that EDCO DOWMETAL Bottom Boards will save you money because they give better mechanical results and last so much longer than even better-than-average wood boards.

Write for complete details and prices covering the wide range of standard sizes.

When used as a combination squeezer and bottom board, EDCO DOWMETAL magnesium boards give firm, equal distribution of pressure, eliminating mold "shifts", "breaks" or "cracks". They maintain high quality of castings and reduce rejects because special *vented design* permits escape of gasses and helps retain sand permeability.

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GLOVE-FIT PROTECTION AGAINST SPLASH . . . This Over-All* rubber goggle with snug fitting resilient rolled edge takes the danger out of splash and spatter; provides wearing comfort over spectacles.

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OBITUARY

LAWRENCE G. PRITZ, 59, president and founder, Ohio Ferro Alloys Corp., Canton, O., died suddenly, Sept. 12. He had been one of the early pioneers in electric furnace steel production, having been connected with the Illinois Steel Corp., Timken Roller Bearing Co. and United Alloy Steel Co. before establishing the Ohio Ferro Alloys Corp. in 1928.

* * *

William T. Shaler, 73, since 1935 consulting engineer, Ajax Flexible Coupling Co. Inc., Westfield, N. Y., died Sept. 25, at his home in Silver Creek, N. Y. Mr. Shaler was associated previously with S. Howes Co., Inc., Silver Creek, N. Y., the Shredded Wheat Co., Allis-Chalmers Mfg. Co., the Firestone Tire & Rubber Co., and Babcock & Wilcox Co.

* * *

Edward A. Walsch, 73, who retired 10 years ago, died Sept. 15 at his home in Keokuk, Iowa. He formerly was associated with the George H. Smith Steel Casting Co., Milwaukee, for many years, and later joined Keokuk Steel Casting Co., Keokuk, Iowa, as superintendent.

* * *

William E. Mueller, 59, president and treasurer, Mueller Co., Decatur, Ill., died Sept. 22 in that city. He was also president and treasurer, Columbian Iron Works, Chattanooga, Tenn., and chairman of Mueller Ltd., Sarnia, Ont., both subsidiaries of Mueller Co.

* * *

R. Herman Mattison, 47, coke engineer, DeBardeleben Coal Corp., Birmingham, died suddenly Sept. 20. Mr. Mattison was identified for many years with the foundry industry of Alabama.

* * *

Henry M. Gehrke, 56, foundry superintendent, Michiana Products Corp., Michigan City, Ind., died Sept. 8, following an illness of two years.

* * *

Charles A. Trowbridge, president of the Duffy-Trowbridge Stove Mfg. Co., Hannibal, Mo., at the time of his retirement in 1940, died Sept. 9, at his home there.

* *

Henry P. Arbenz, 59, for 30 years associated with F. W. Marshall & Co., Philadelphia, sellers of pig iron, ore and alloys, died recently in that city as a result of injuries sustained in an accident last July. He began his business career with Stanley G. Flagg &

(*Concluded on page* 168)

Ever figured what a rejected casting costs you?

Wasted man-hours ____
Idle casting metal . ____
Lost machine time . ____
Wasted cores . . . ____
Inspection . . . . . ____
Wear on sand . . . ____
Breaking up casting ____

FEWER REJECTS WITH ALCOA ALUMINUM PIG AND INGOT

You get fewer rejected castings when you use pig and ingot of controlled quality . . . Alcoa Aluminum Pig and Ingot. The quality is controlled from bauxite to finished ingot. Just the right amounts of the correct alloying elements are added to give you the strength and casting qualities you require for each type of casting.

All the many Alcoa Aluminum Casting Alloys are available now for immediate shipment to you. Telephone the nearby Alcoa Sales Office, or write to ALUMINUM COMPANY OF AMERICA, 1823 Gulf Building, Pittsburgh 19, Penna. Sales offices in 54 leading cities.

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Ask for your copy of "Casting Alcoa Alloys", a 140-page how-to-do-it manual for the designer, foundryman, and patternmaker.

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ALCOA FIRST IN ALUMINUM

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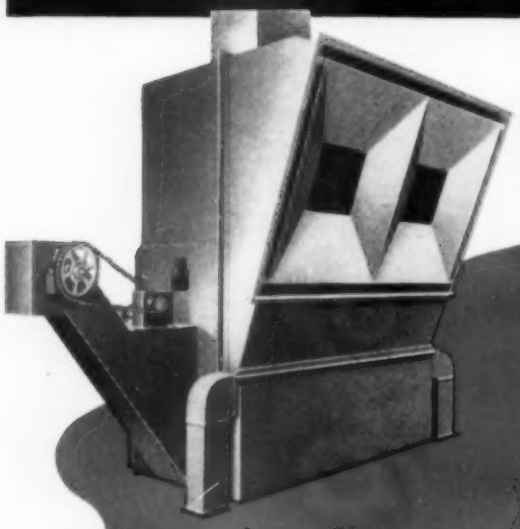

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1	Collects, water washes and dries, then exhausts foundry air—*within one compact unit.*
2	Installed in three easy steps—(1) Locate in place, (2) Connect exhaust duct, (3) Connect electric and water services.
3	Occupies up to 75% less floor space and cubic space.
4	Fan is only moving part in unit . . . water is continuously recirculated by fan suction. No nozzles or pumps to clog.
5	With Automatic Damper attached, these units operate as heavy duty space air washers when the shake-out is not in operation.
6	Five standard units—5,000, 7,500, 10,000, 12,500, 15,000 CFM—used individually or in combination to cope with any dust condition from shake-out, core knock-out, shaker screening, sand transfer, mold conveyor and pouring operations.
7	Lower initial cost than any system of comparable capacity.

SEND FOR CATALOG WHICH CONTAINS COMPLETE DETAILS

Established 1912

NEWCOMB-DETROIT COMPANY

5741 Russell Street • Detroit 11, Michigan

(*Concluded from page* 166)

Co., Stowe, Pa., malleable founders, eventually becoming purchasing agent. Later he became affiliated with Debevoise-Anderson Co., New York City, in the sale of pig iron, going from there to the Marshall company.

* * *

Frank G. Schaub, 43, treasurer, Calumet Steel Castings Corp., Hammond, Ind., and vice president, the Z.V.S. Co., Chicago, died Sept. 30 in Chicago following an illness of five months.

* * *

Joseph N. Snyder, 67, retired superintendent of Reliance Steel Casting Co., Pittsburgh, died Sept. 24, at his home in Sharon, Pa., his native city.

* * *

W. Gibson Carey Jr., 51, president, Yale & Towne Mfg. Co., Stamford, Conn., was drowned Oct. 4, at Ponte Vedra Beach, Fla., while swimming there.

* * *

Floyd K. Lawson, 48, executive vice president and treasurer, George D. Roper Corp., Rockford, Ill., died Sept. 19 in West Yellowstone, Mont.

* * *

G. F. Snyder, founder and past president of Snyder Foundry Supply Co., Los Angeles, died recently.

RELIABILITY OF TEST BAR PROPERTIES

(*Continued from page* 99)

ing article of this series, some gas absorption from the natural green sand mold constitutes an uncontrolled variable, unrelated to the quality of the melt in the pouring ladle, and therefore may be the principal cause of the unreliability of single bar values or even the average of two bars as a measure of the quality of the melt in the pouring ladle. The desirability of the development of a more suitable mold material for test bars is apparent. Such a mold material should produce cooling rate comparable to natural green sand, but not be a source of gas.

References

51. "Test Bars for 85-5-5-5 Alloy, Their Design, and Some Factors Affecting Their Properties," AFA Lecture, Spring, 1946.

Copyright 1947 by I. Glueck for the benefit of the members of the Non-Ferrous Ingot Metal Institute.

Hoover Foundry, 1457 Bates St., Indianapolis 1, owned and operated by O. C. and Wilbur Hoover, recently was opened and is producing job gray iron castings.

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

With a Lift of Her Finger... She Raises Pressure by the Ton!

U. S. Royalite Grinding Wheel Sample being tested with this specially-designed machine in a U. S. Rubber Company laboratory.

Here, on a specially-designed machine, "U. S." engineers have taken a grinding wheel sample and just tested it to destruction!

But before this grinding wheel reached the breaking point, it had proved its ability not only to meet, but to *surpass*, the strict specifications demanded by the customer's job.

Thorough testing in "U. S." research laboratories is one of the reasons why U. S. Royalite Grinding Wheels are so much in demand, testing that covers not only abrasives and bonds of every kind, but also the related fields covered by all the products of United States Rubber Company.

Then there's the test of time. Experience built up in the course of 84 years enables "U. S." to solve current wheel problems of every type—and to anticipate future problems brought on by higher production quotas and new manufacturing techniques.

As a result, whether you're snagging castings, grinding ball races or working with billets, bits, slabs or sauce pans, you'll find a U. S. Royalite Wheel carefully *engineered to your job*. In addition, "U. S." field engineers, by thorough testing right in your own plant, can give you accurate grinding wheel costs *in advance*.

For complete information, write to Mechanical Goods Division, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

When this midwestern iron foundry adopted high speed snagging 17 years ago, it picked U. S. Royalite Wheels. It has been using them ever since on the basis of their superior performance.

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Nonferrous Costing Methods Detailed

Non-Ferrous Founders' Society, 127 North Dearborn St., Chicago 2, has published a new book dealing with accounting procedure and cost determination applicable to the nonferrous foundry. It incorporates two previously published works by the society's cost committee.

The first two sections provide data on the minimum requirements for general accounting principles and cost finding methods for better controls and more profitable operations. Simple examples and clear definitions of the nomenclature and terms used are given.

Third section provides additional information desired by larger or high production foundries that have expanded beyond the use of the simplified cost system and require more details on items of expense.

AFA Names Steel Research Committee

The American Foundrymen's Association has announced appointments to the Steel Division Research Committee, which will direct AFA-sponsored research programs in steel technology.

Clyde Wyman, metallurgist, Burnside Steel Foundry Co., Chicago, is chairman and Charles F. Christopher, Continental Foundry & Machine Co., East Chicago, Ind., is secretary. Other members of the committee are: R. H. Frank, chief metallurgist, Bonney-Floyd Co., Columbus, O.; Gustaf A. Lillieqvist, research director, Indiana Harbor Works, American Steel Foundries, East Chicago, and Dr. C. H. Lorig, assistant director, Battelle Memorial Institute, Columbus.

Combine Divisions

Consolidation of two divisions of the National Bureau of Standards, Washington, those of Commercial Standards and Simplified Practices, into a single division called Commodity Standards has been announced by Dr. E. U. Condon, director of the bureau. New division will continue the bureau's coordinating role in the development of voluntary simplified practice recommendations and commercial standards with industrial and technical groups. In addition the division will be responsible for co-ordinating bureau work for the Federal Specifications Board. Edwin W. Ely, former chief of the Simplified Prac-

(*Concluded on page* 172)

FOUNDRIES NOW UNDER CONSTRUCTION

Mechanization projects, facilities installations, complete new foundries, logically engineered . . . now under construction . . . soon to be producing better castings, lower costs, higher profits for foundry operators who have collaborated with Giffels & Vallet, Inc. in order to efficiently and quickly solve their foundry engineering problems.

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Brazilian Railroad Equipment Co.....Sao Paulo, Brazil
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Carver Pump Company.....Muscatine, Iowa
J. I. Case Company.....Racine, Wisconsin
Central Iron Foundry Company.....Detroit, Michigan
Central Specialty Division
King-Seeley Corp.....Ypsilanti, Michigan
Ford Motor Company.....Dearborn, Michigan
Sealed Power Corporation.....Muskegon, Michigan
Sofunge.....Sao Paulo, Brazil
Unitcast Corporation.....Toledo, Ohio

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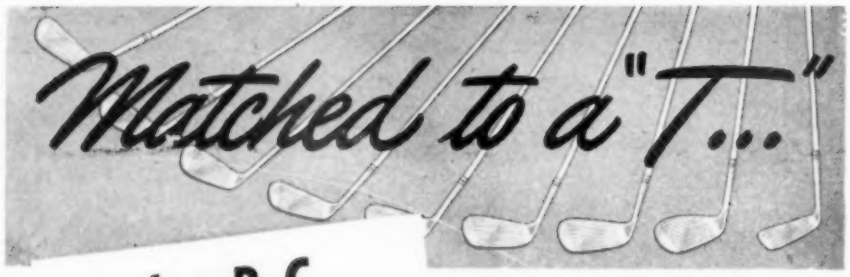

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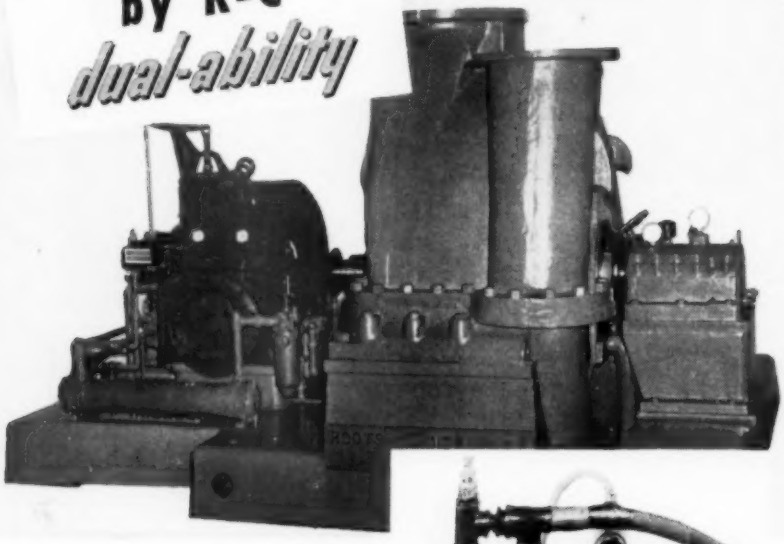

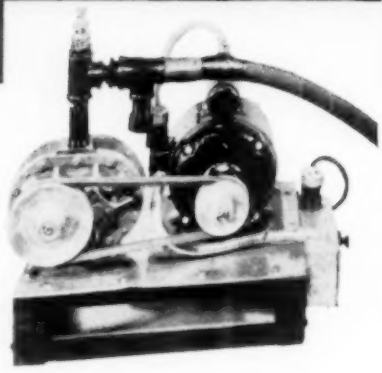

When selecting air or gas-moving equipment, watch that most important point of matching it to the job. Capacity, pressure, drive, size, weight and other factors must be carefully considered, to give you satisfactory operation.

That's where R-C *dual-ability* goes to work for you. With small-to-large sizes and many styles of both Centrifugal and Rotary Positive designs, we can be completely unbiased in our recommendations. For instance, coke oven operation called for the large Centrifugal Exhauster illustrated (top, above), with capacity of 16,850 CFM. The compact, lightweight Rotary Positive unit exactly meets the need for a low-capacity, portable vacuum pump in the graphic arts industry.

Similarly, your needs can be *matched to a "T"* with our small or large Centrifugal or Rotary Positive equipment. Call on R-C *dual-ability* to help solve your air or gas-moving problems.

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BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

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(*Concluded from page* 170)

tice Division has been appointed chief of Commodity Standards Division and F. W. Reynolds, former acting chief of Commercial Standards, as assistant chief.

AFA Convention Committee Named

The general arrangements committee for the 1948 convention and exhibit of the American Foundrymen's Association in Philadelphia, May 3 to 7, will be headed by John M. Robb Jr., Philadelphia resident manager of Hickman, Williams & Co.

A director of the AFA and member of its executive committee, Mr. Robb is a charter member and past chairman of the Philadelphia Chapter which will be host to the 52nd annual meeting.

Vice chairman of the general committee is William Morley, foundry manager, Olney Foundry Division, Link-Belt Co., Philadelphia. Other members of the group include B. A. Miller, chief metallurgist, Cramp Brass & Iron Foundries Division Baldwin Locomotive Works, a director and the immediate past chairman of the chapter; W. B. Wilkins, president and general manager, American Manganese Bronze Co.; Stanley Kirn, president, M. L. Kirn & Bros.; Thomas J. Gerwig, sales representative, Republic Steel Corp.; H. L. McClees, president, Crucible Steel Casting Co. and George F. Pettinos Jr., vice president and general manager, George F. Pettinos Inc.

Book Review

ASTM Book of Standards 1946. Part I-A Ferrous Metals, cloth, 1181 pages, 6 x 9 inches, published by the American Society for Testing Materials, Philadelphia. Price $8.

Containing approximately 225 standard and tentative specifications relating to ferrous materials this publication of the American Society for Testing Materials includes the latest revisions. Of the specifications presented 16 deal with steel castings and 21 with cast and malleable iron castings. Text material is arranged in double column format which provides easier reading. To aid the reader in searching for a specific specification three indexes are included. One lists the specifications as to classification such as structural and rivet steel, steel castings, cast and malleable iron, etc. Another lists them by numeric sequence while the third indexes the specifications under subject.

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NOW IN OUR 5TH YEAR MAKING SAND CORES FOR THE FOUNDRY INDUSTRY

* Convinced that our idea of making and selling cores to order for the foundry trade was sound, we first offered this service in August 1942. We have outgrown three plants which indicates the acceptance of the idea! We make cores of finest quality which after baking, are cleaned, inspected and packed in cartons for truck shipment to you. Just send us your core boxes, specify type of metal poured and we will do the rest.

If your coreroom is a bottleneck or overloaded, we can help you. Now in our fifth year, we specialize in making cores for all types of foundries. Illustrated is a view of our new plant, complete with the latest core-making and core-baking equipment for fast production of high quality cores. We are regularly serving foundries as far as 300 miles distant. For the foundry having no coremaking facilities and foundries needing a supplemental source of supply for good cores, our service has proven most satisfactory. We invite your inquiries.

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Industry BRIEFS

A. L. SCHWAB INDUSTRIES INC., New Philadelphia, O., which was organized a year ago and began production of malleable iron early this year, has sold its business to the Ridge Tool Co., Elyria, O. The latter company will continue the production of malleable iron castings at the New Philadelphia plant, for its own use.

* * *

Central Foundry Division, General Motors Corp., has begun construction of its gray iron foundry near Defiance, O. The foundry is expected to be completed and in operation next spring. Central Foundry Division executives supervising construction are R. H. Mooney, plant engineer, and Carl Beverly, resident comptroller.

* * *

McGill Mfg. Co., 259 Indiana Ave., Valparaiso, Ind, has started construction of a $300,000 bearing division plant. The structure, a two-story brick building, will adjoin the present bearing division plant. Manufacturing facilities for precision bearings will be expanded to occupy the ground floor. General offices also will be housed in the addition, which is part of a general expansion program expected to require 16 to 18 months. A new 60 x 200-foot wing at the electrical division is virtually completed.

* * *

The Arthur J. Tuscany organization with headquarters in the Engineers building, Cleveland 14, economic counselors and organizers and managers of trade associations, has completed the assignment undertaken in July, 1946, for the Foundry Supply Manufacturers' Association, Law and Finance building, Pittsburgh.

* * *

Hamilton Rubber Mfg. Corp., Trenton, N. J., has opened a branch office and warehouse at 2017 Preston Ave., Houston, Tex., under the direction of W. A. Olivier, who recently was appointed general manager of Hamilton's southern division. Lex O. Carmichael is assistant branch manager.

* * *

Eutectic Welding Alloys Corp., 40 Worth St., New York 13, has opened a new plant at 110 Duane St., New York, capable of turning out 90 special types of welding rods, valued at $10 million annually. Included in the plant, which is laid out for straight-line production and which occupies 37,000 sq ft, are a nonferrous and ferrous foundry.

* * *

Odill Foundry & Mfg. Co. newly incorporated as an affiliate of the Excelsior Foundry Co., Belleville Ill., has leased 18,000 sq ft of floor space in the Illinois Ordnance Plant at Crab Orchard Lake. Company will manufacture gray iron castings for small production machinery, motors, etc.

* * *

Taylor & Boggis Foundry Co., 1261 Babbit Rd., Cleveland 17, subsidiary of Consolidated Iron & Steel Mfg. Co., 1290 East 53rd St., Cleveland 14, is building a 1-story, 20 x 96 ft addition to its plant. The addition will house locker and wash rooms and a small factory office.

* * *

Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis 7, has purchased the trade name, patents, copyrights and inventory of the Round Oak Co., Front St., Dowagiac, Mich., and has formed the Round Oak Co. Inc., to be a subsidiary of the Peerless Foundry Co., Indianapolis.

* * *

Northern Ohio Castings Inc. has been organized to operate a foundry and machine shop. Incorporators are Samuel H. Weiss, Adolph E. Friedman and Melvin Stern, all associated with the Friedman Fixture Co., 1020 Woodland Ave., Cleveland.

* * *

Ferguson Die Casting Corp., Ontario, Calif., has been formed with 20,000 shares of no par value capital stock. Directors are Charles E. Ferguson and Karl Wenzlaff, both of Ontario, and William R. Sands, Crestline, Calif.

* * *

Eureka Boiler Works and Acme Foundry Co., foot of "S" St., Eureka, Calif., was incorported recently with capital of $1 million. Directors are L. W. Wrixon, Berkeley, Calif., and Cyril Louis Weeks and Jesse Collinson, both of San Francisco.

* * *

Banner Iron Works, 4560 Shaw Blvd., St. Louis, has appointed Max R. Wise, Tulsa, Okla., as its sales agent. Mr. Wise also represents the St. Louis Steel Castings Co., General Metal Products Co. and Arrow Parts Forging Co.

* * *

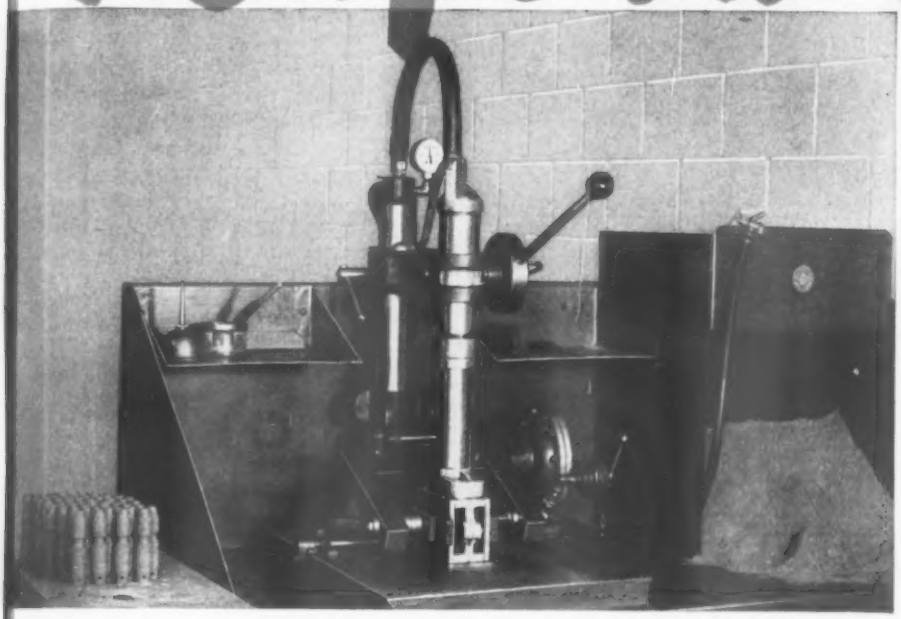
De Sanno Foundry & Machine Co., 1919 Peralta St., Oakland 7, Calif., has been incorporated with capital of $250,000. Directors are Clara J.

(*Continued on page* 176)

BUILDS NEW FOUNDRY: New building of the Paul M. Wiener Foundry Co., Tenth St. and Western Ave., Muskegon, Mich., was built around and over the old structure without interrupting foundry operations. Walls and roof of the old building were removed after the new walls and roof were completed. Much of the new equipment already has been installed and the balance is in the process of installation

Redford

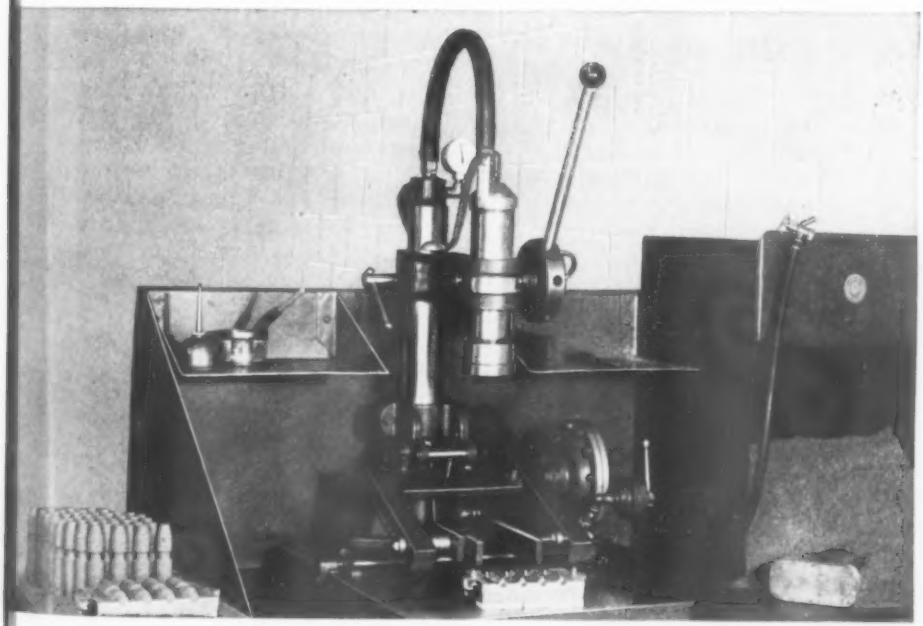
CORE BLOWER CARTRIDGE TYPE



NEW AIR OPERATED CORE BOX CLAMPING ATTACHMENT

At the request of hundreds of Redford users, we have developed the NEW AIR OPERATED CORE BOX CLAMPING ATTACHMENT, for blowing vertically split core boxes, as shown in operation in photographs.

Permits maximum table clearance—simple to install and operate—can be swung to one side to clear table for blowing horizontally split core boxes.



• PROVEN •

Hundreds of foundries are using Redfor as an efficient low cost means of pr ducing small cores. The high percentag of reorders we receive proves that Re fords are profitable to own.

• SIMPLICITY •

The Redford reduces core blowing to i simplest form. Anyone can understand- operate and maintain it.

• SPEED •

All the work of handling core box an driers is done on the machine. Cartridg can be quickly loaded by hand. As man as 200 boxes are being blown and draw by one operator in one hour.

• FLEXIBILITY •

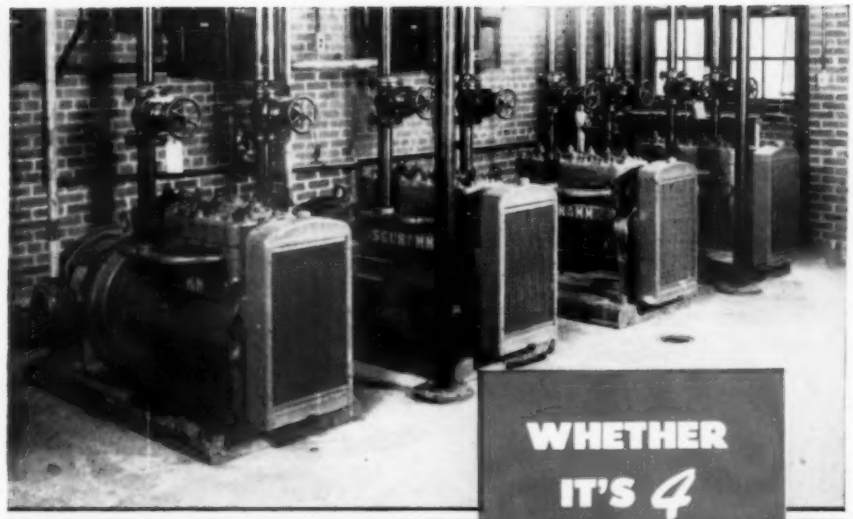
With a Redford you can make any numbe of different cores without loss of time fo changeovers. Here is what a large jobbin foundry has to say: "We are using Redfords. Your development of th portable cartridge which can be made part of the core box equipment, has give us all the advantages of core blowin without loss of flexibility so essentia to us."

Write today for complete information and new folder

Redford IRON & EQUIPMENT CO.

PHONE: REDFORD 8611

21315 W. McNICHOLS ROAD • DETROIT 19, MICHIGAN



WHETHER IT'S 4 SCHRAMMS IN A ROW

OR 1 SCHRAMM BY ITSELF

YOU GET AIR ECONOMICALLY IN YOUR PLANT *anywhere*

Schramm Air Compressors can be easily installed as a unit system in plants requiring varying compressor loads and Schramm's Automatic Control makes it possible to operate them singly or in units as varying air requirements demand.

Schramm features are distinct: 100% water cooled . . . Forced feed lubrication . . . Mechanical intake valve . . . lightweight, compact, *vibrationless*. There are many compressed air jobs in plants that are ably done by Schramm.

Stationary Schramm Compressors range in size from 2 to 600 cu. ft. displacement. For construction jobs around your plant there are portable units. Regardless of your compressed air need, there is a Schramm Air Compressor available to do the work.

Write us today for complete literature.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

(*Continued from page* 174)

De Sanno and Aline C. Wulfendinger, both of Oakland, and Roy C. Wendlebo, Alameda, Calif. After the death of Frederick De Sanno, his son-in-law, Roy C. Wendlebo, took over the general management of the business. There is no other change in the name or management of the business.

* * *

Acheson Colloids Corp., Port Huron, Mich., through its wholly owned subsidiary, Acheson Colloids Ltd., London, England, has bought the entire operating assets of E. G. Acheson Ltd., which, although similar in name, was a completely independent concern.

* * *

Robert B. Seger and Andrew L. Olson, formerly superintendent and assistant superintendent, respectively, of the Lindberg Steel Treating Co., Chicago, have acquired ownership and management of the Chicago Steel Treating Co., 333 North California Ave., Chicago.

* * *

Lindberg Engineering Co. has opened a new office at 1114 NBC Bldg., 815 Superior Ave., Cleveland. Under the direction of Stuart K. Oliver, formerly with the company's New York office, the new office will handle all Ohio except the extreme western portion.

* * *

Mountain City Foundry & Machine Co., 200 South Acadamy St., Greenville, S. C., and Hunt Loom Co., Greenville, have merged under the name of Hunt Machine Works Inc. with a capital stock of $2 million. John O. Hunt is president.

* * *

Bruce Foundry Co., Bruce, Wis., has been incorporated with minimum capital of $4000 for the manufacture of iron pipe, fittings and plumbing supplies. Incorporators are Fred H. Conover, Victor F. Johnson and John Kovacevich.

* * *

Ozark Foundry Stove & Furnace Co., Ironton, Mo., will occupy the old Kaut-White shoe factory in East Ironton. Work has been started on the walls and roof of the burned-out shoe factory building. John Doan, Potosi, Mo., will operate the foundry.

* * *

Wheeler Consultancy, 196 Worthington St., Springfield, Mass., specializing in permanent mold work, recently became a corporation. Maj. Jack W. Wheeler, president and chief consultant, formerly was head of the Rolls Royce permanent mold foundry and previously was associated with

(*Continued on page* 179)

Quality Control in the foundry a job for PYROLANCE!

Quick, accurate temperature readings of molten metal are reason enough why so many non-ferrous foundry operators depend on the Alnor Pyrolance! The protected thermocouple, with adjustable angle head, is mounted in the lance tip—takes temperatures below the surface, unaffected by dross or other conditions. And the rugged pyrometer movement gives accurate readings—quickly, of course. A well-balanced, easily handled instrument you'll like from the first time you try it.

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

ILLINOIS TESTING LABORATORIES, INC., Chicago 10, Illinois

GET THE WHOLE STORY!

Get a copy of this informative Pyrolance bulletin. Includes photos, complete descriptions and prices. Use this coupon.

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Rm. 511, 420 N. LaSalle Street, Chicago 10, Illinois
( ) Send me a copy of Bulletin 1724-D

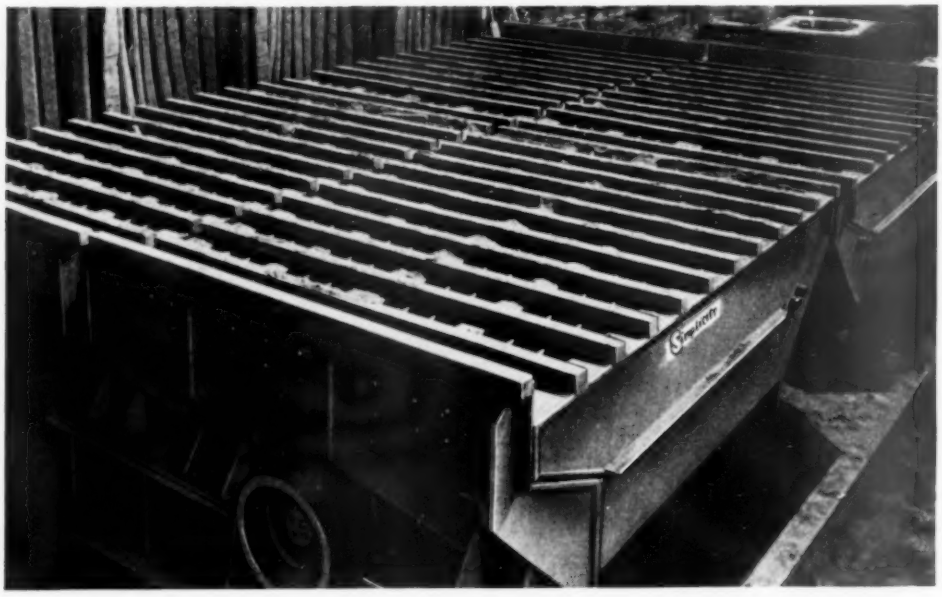
Name .....

Company Name .....

Address .....

City ..... State .....

FOR BIG JOBS.....
SPECIFY SIMPLICITY!



Progressive, production-minded foundry operators the country over are specifying Simplicity shake-out units for their biggest operations—and they're saving time and money on the job. For example, there's the Simplicity Quad unit, illustrated, with 100% vibrating deck area which handles loads up to 85 tons in an eastern foundry with high efficiency and negligible maintenance. A simplicity 8′ x 10′ dual shake-out helped to effect savings of more than 65% in shake-out labor and 75% in time in an Ohio foundry. In another eastern steel foundry, the general superintendent describes the Simplicity 8′ x 10′ dual shake-out as the most trouble-free foundry unit ever installed in that plant.

Simplicity shake-outs are built big, tough, and efficient. We now build or will design and build models to meet your specific requirements. Send us complete particulars of your foundry production for recommendations.

WRITE FOR NEW BULLETIN JUST RELEASED!

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY
DURAND, MICHIGAN

FOR CANADA: CANADIAN BRIDGE ENGINEERING CO. LTD., WALKERVILLE, ONTARIO

(*Continued from page* 176)

the British Aluminum Co. He came to the United States in 1944. In addition to mold design, manufacture and breaking-in, the company also operates a department concerned with industrial styling and product design. Other activities include the manufacture of mold dressing and foundry supplies.

* * *

Noblesville Castings Co., South Eighth St., Noblesville, Ind. enlarging for the second time in recent months, has built another addition to its foundry building and has increased production facilities by approximately 50 per cent.

* * *

American Brass & Aluminum Co., formerly of Corunna, Ind., has moved to Avilla, Ind., and reopened Sept. 15 in a new 52 x 80 ft building. Foundry is producing aluminum, brass and lead castings. D. D. Harding is manager.

* * *

Akansas Foundry Co., 1501 East Sixth St., Little Rock, Ark., plans to open a branch office and warehouse in Forrest City, Ark. Grey Gentry, formerly in the Little Rock office, will manage the branch.

* * *

Electric Furnace Co., Wilson St., at Pennsylvania Railroad, Salem, O., has opened a district office at 312 McKerchey Bldg., 2631 Woodward Ave., Detroit 1. B. C. Thompson is district manager.

* * *

Bay State Refining Co., 8 Montgomery St., Chicopee Falls, Mass., has been appointed distributor in that area for aluminum ingot by Reynolds Metals Co., 2500 South Third St., Louisville.

* * *

Air Reduction Sales Co., New York, has opened a new acetylene plant in Dayton, O. R. K. Haygood, who has been with the company for over 10 years, has been appointed plant superintendent.

* * *

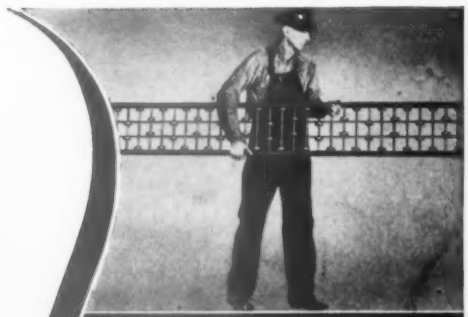
Clio Foundry Inc., 205 Johnson St., Clio, Mich., plans a 56 x 75 ft addition on the south end of its present building. Orders have been placed for a bank of modern, gas fired and electrically controlled core ovens.

* * *

Gardner-Denver Co., Quincy, Ill., has opened new branch offices in New Orleans, Cleveland and Kansas City, Mo. The new branch office in New Orleans is at 1034 Camp St., and M. B. Morresette is manager. In Cleve-

(*Concluded on page* 183)

Need any one or all three?



a SECTION

a SYSTEM

a Portable All-Purpose UNIT

THE range and versatility of Standard Conveyor equipment is the result of nearly 40 years of close contact with conveying problems — large and small installations.

If you need just a light, portable section of conveyor to speed handling in warehouse or on shipping platform — complete, continuous flow system linking manufatturing or packaging operations — or a portable unit to speed handling in storage and shipping areas — Standard Conveyor Company can supply you with any one or all three.

Write for "Conveyors by Standard" Bulletin No. F-117 — a valuable conveyor reference book that will be useful to you.

STANDARD CONVEYOR CO.

General Offices: North St. Paul 9, Minn.

Sales and Service in Principal Cities

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MANUFACTURERS ASSOCIATION FOUNDRY EQUIPMENT INC.

ROLLER · BELT · SLAT · PUSHBAR CONVEYORS · PORTABLE CONVEYORS AND PILERS · SPIRAL CHUTES · PNEUMATIC TUBE SYSTEMS

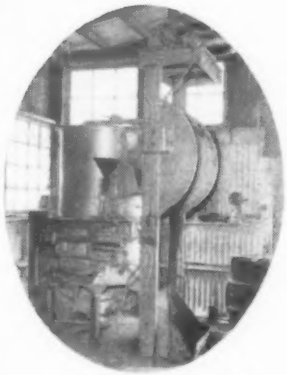
increase

in casting production

This No. 50 Speedmullor at Ace Foundry, Ltd. serves the No. 1 molding unit and thoroughly mulls approximately 140 tons of sand per day . . . in one-minute mulling cycles. Its batch capacity is 7½ cu. ft.

SPEEDMULLORS AT ACE FOUNDRY, LTD., IN LOS ANGELES MULL 280 TONS OF SAND PER DAY IN ONE-MINUTE CYCLES

Increase in casting tonnage . . . from 18 tons up to 40 tons per day! Three Speedmullors—two serving the molding units and one serving the core room help Ace Foundry, Ltd. to more than double production—and in the same amount of floor space. Thorough mulling in one-minute cycles! Overhead costs and production costs considerably reduced! And in addition, Speedmullor mulled sand definitely improves Ace's casting quality!



Model 30 Speedmullor with skip hoist at Ace Foundry, Ltd., serves the core room. Mulling cycle is 1½ minutes per batch (3 cu. ft.)

SPEEDMULLOR

The Speedmullor is 4½ times as fast as any other mullor! Speedmullors are furnished with or without skip hoist; air cooling; fines removal. For maximum production and efficiency, Speedmullors are equipped for complete automatic operation—loading, mulling, fines removal and discharging. Write now for a Speedmullor catalog.

THE BEARDSLEY & PIPER COMPANY

Plant: **2541 N. Keeler Ave.** General Offices: **2424 N. Cicero Ave.**

Chicago 39, Illinois

It's a B&P Product! Sandslinger • Speedslinger • Speedmullor • Screenarator • Mulbaro • Sand Conditioning Machine • Champion Speed-Draw

Another No. 50 Speedmullor serves Ace's No. 2 molding unit. A girl operator easily controls all of the machine's operations.

THE FIRST AND LAST WORD IN ELECTRICAL TOOLS

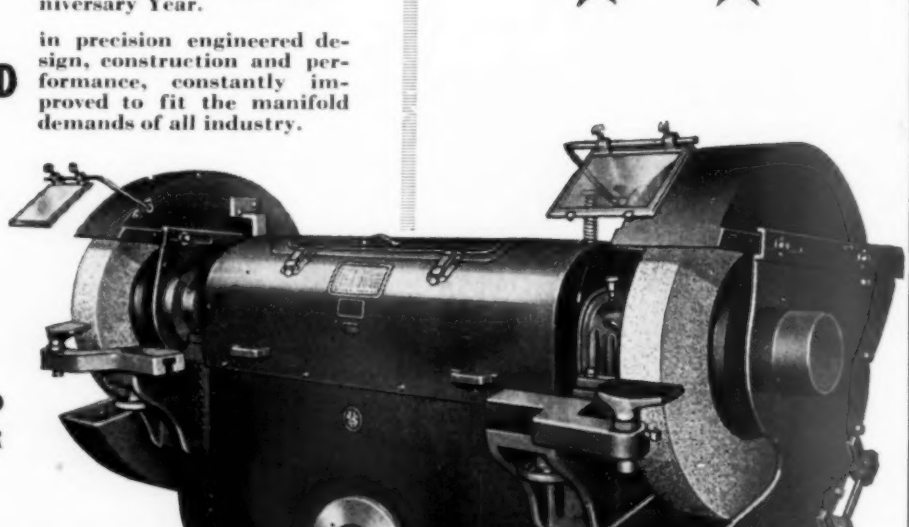
★

United States Electrical Tools

THE FIRST WORD because the original electrical tools invented by Col. John A. Smith were the beginnings of the industry fifty years ago .... this is our Golden Anniversary Year.

★ ★

THE LAST WORD in precision engineered design, construction and performance, constantly improved to fit the manifold demands of all industry.



ADJUSTABLE SPEED
SNAGGING GRINDER
MODEL 69

Four speed changes. Four ball bearings on spindle. For heaviest type production grinding. Wheel guards adjustable to wheel wear. Four speed gear drive transmission. Electric interlock prevents operation of machine unless gears are in mesh.

★ ★

YOUR JOBBER CAN SUPPLY YOU

Tools and accessories are carried in stock by the most dependable jobbers in your area ... their salesmen can help you select the proper tool for the job, as well as thousands of other items. Buy from your local jobber and enjoy his convenient, economical service.

THE UNITED STATES ELECTRICAL TOOL CO. OUR 50th YEAR CINCINNATI, OHIO

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

(*Concluded from page* 179)

land the office is at 8015 Carnegie Ave., with R. A. Williams as manager. E. C. Wallace is branch manager of the Kansas City office located at 2805 Main St.

* * *

Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh 22, has purchased the Louthan Mfg. Co., East Liverpool, O., makers of potters' supplies and electric appliance ceramics.

* * *

Exomet Inc., West Maple Ave., Conneaut, O., has started production of an exothermic material employed in foundry practice. Michael Bock II is chief engineer for the company and Erich O. Pletsch is plant manager.

* * *

Scott Aviation Corp., 207 Erie St., Lancaster, N. Y., has acquired the manufacturing and sales rights of the Easy-tote Products Co., formerly of Arcade, N. Y.

* * *

Alloy Grairon Foundry Co., Union Church, Wis., has been incorporated as a gray iron foundry. Incorporators are Leonard and Minnie Wanarek and George W. Kliegel.

* * *

J. B. Foote Foundry Co., 823 North Main St., Fredericktown, O., plans construction of a 40 x 110 one-story shop and storage building on the lot south of the present east shop.

* * *

Liquid Carbonic Corp., Chicago has completed a new oxygen manufacturing plant in Buffalo, N. Y. J. J. Kelley is in charge of the Buffalo branch.

* * *

Foundry Equipment Co., 1831 Columbus Rd., Cleveland, plans construction of a one-story 40 x 100 ft warehouse at 1853 Columbus Rd.

* * *

C. E. Miller Mfg. Co., Anderson, Ind., has discontinued its aluminum foundry and pattern shop. The equipment is being sold.

* * *

Overmyer Mould Co., North Main St., Winchester, Ind., is nearing completion of a new building designed to double factory and office space.

* * *

S & S Foundry Co., 1103 South Hendricks Ave., Marion, Ind., now under new management, has been renamed M & J Foundry Co.

* * *

Decatur Casting Co., 822 Dayton Ave., Decatur, Ind., has built and opened a new 75 x 35-ft pattern storage building.

Mulbaro's mulling mechanism being lowered onto barrow at Florence Pipe Foundry & Machine Co. This Mulbaro saves 30% in core oils and over 50% in mulling time!

This one Mulbaro with seven barrows serves four core makers and keeps them constantly supplied with thoroughly mulled sand.

THE MULBARO

IN OPERATION AT FLORENCE PIPE FOUNDRY & MACHINE CO., FLORENCE, N. J.

Low Cost Mulling

The Mulbaro is the only really portable muller . . . the only versatile muller. Low in initial cost, economical in operation, it is ideal for regular or special batches in small or large foundries. Just fill the barrow with sand, lower the mulling mechanism, and the rubber covered muller wheels and the steel plow assembly go to work—mulling thoroughly and quickly. When mulled, the sand is in its container, ready for delivery. Available in 2 sizes . . . 3½ and 7 cu. ft. batch capacity. Get complete information — Phone Chicago, Berkshire 3700 — or write:

The Beardsley & Piper Company
General Offices: 2424 N. Cicero Ave.
Plant: 2541 N. Keeler Ave.
Chicago 39, Ill.

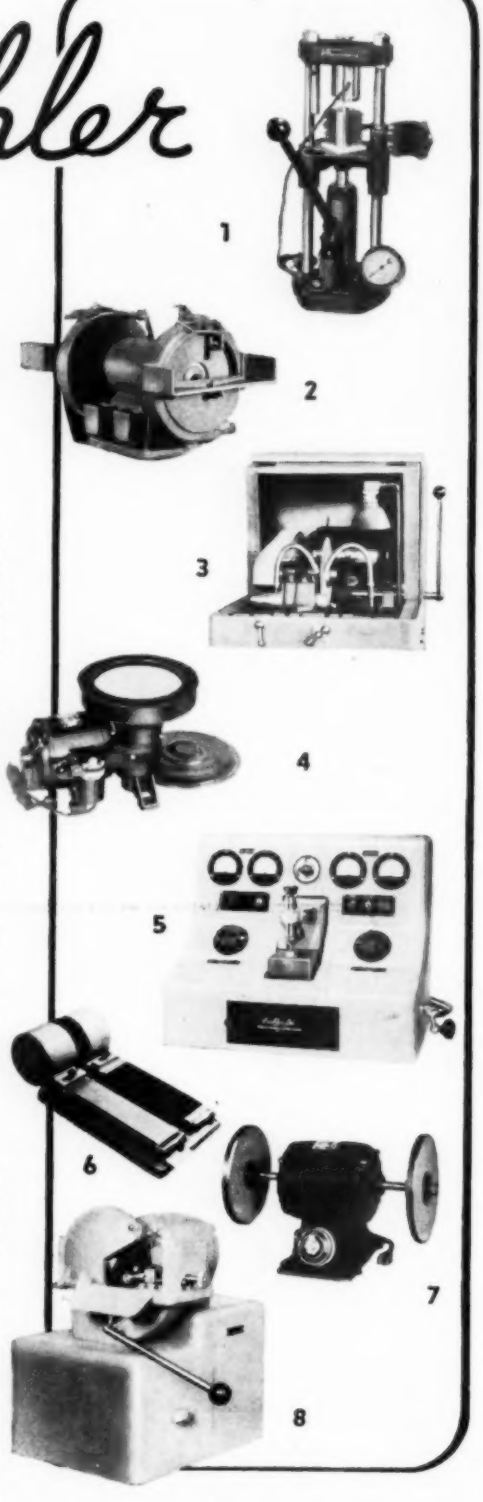
B&P

It's a B&P Product! Sandslinger • Speedslinger Speedmuller • Screenerator • Mulbaro Sand Conditioner • Champion Speed-Draw

Buehler

Offers a Complete Line of Equipment for the . . . METALLURGICAL LABORATORY

Buehler specimen preparation equipment is designed especially for the metallurgist, and is built with a high degree of precision and accuracy for the fast production of the finest quality of metallurgical specimens.



1. No. 1315 Press for the rapid moulding of specimen mounts, either bakelite or transparent plastic. Heating element can be raised and cooling blocks swung into position without releasing pressure on the mold.

2. No. 1210 Wet power grinder with ¾" hp. ball bearing motor totally enclosed. Has two 12" wheels mounted on metal plates for coarse and medium grinding.

3. No. 1000 Cut-off machine is a heavy duty cutter for stock up to 3½". Powered with a 3 hp. totally enclosed motor with cut-off wheel, 12" x 3/32" x 1-1/4".

4. 1505-2AB Low Speed Polisher complete with 8" balanced bronze polishing disc. Mounted to ¼ hp. ball bearing, two speed motor, with right angle gear reduction for 161 and 246 R.P.M. spindle speeds.

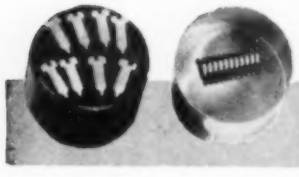
5. No. 1700 New Buehler-Waisman Electro Polisher produces scratch-free specimens in a fraction of the time usually required for polishing. Speed with dependable results is obtained with both ferrous and non-ferrous samples. Simple to operate—does not require an expert technician to produce good specimens.

6. No 1410 Hand Grinder conveniently arranged for two stage grinding with medium and fine emery paper on twin grinding surfaces. A reserve supply of 150 ft. of abrasive paper is contained in rolls and can be quickly drawn into position for use.

7. No. 1400 Emery paper disc grinder. Four grades of abrasive paper are provided for grinding on the four sides of discs, 8" in diameter. Motor 1/3 hp. with two speeds, 575 and 1150 R.P.M.

8. No. 1015 Cut-off machine for table mounting with separate unit recirculating cooling system No. 1016. Motor 1 hp. with capacity for cutting 1" stock.

The Buehler Line of Specimen Preparation Equipment includes . . . Cut-off Machines • Specimen Mount Presses • Power Grinders • Emery Paper Grinders • Hand Grinders • Belt Surfacers • Mechanical and Electro Polishers • Polishing Cloths • Polishing Abrasives.



Buehler Ltd.

A PARTNERSHIP

METALLURGICAL APPARATUS

165 WEST WACKER DRIVE, CHICAGO 1, ILLINOIS

Materials Handling Show Is Planned

The second national Materials Handling Exposition will be held at Cleveland in the Auditorium, Jan. 12 to 16 inclusive. All systems of materials handling are expected to be on exhibit.

Educational features will include a conference on materials handling, which will be held concurrently with the exposition; a materials handling theater, which will present films on handling subjects, and an institutional presentation of materials handling equipment and systems in addition to those shown in the commercial exhibits.

Edwin J. Heimer, president, Barrett-Cravens Co., Chicago, is chairman of the exposition committee, which includes Lloyd Backart, president, Rapids-Standard Co. Inc., Grand Rapids, Mich.; Ezra W. Clark, materials handling consultant, Battle Creek, Mich.; Irving B. Hexter, publisher, *Flow* magazine, Cleveland, and R. L. Wolter, sales manager, Automatic Transportation Co., Chicago.

Clapp & Poliak Inc., 350 Fifth Ave., New York 1, manage the exposition. Information about the show, the program and hotel accommodations may be obtained from that office.

Centrifugally Cast Copper Alloys

In an investigation of "The Centrifugal Casting of Copper Alloy Wheels in Sand Molds" by O. R. J. Lee and I. Northcott, published in the April issue of the *Journal* of the Institute of Metals (London), it was indicated that the minimum ratio of arm cross section to rim volume of 1:10 seems to be a rough basis for design calculation, although if the ratio were considerably exceeded, lower speeds of rotation might be possible. Narrow freezing range alloys (aluminum bronze and high-tensile brass) are not as suitable for the process as the wide freezing range (gun metals and phosphor bronze).

With aluminum bronze and high-tensile brass a high speed of rotation during casting should be employed and no metallurgical defects due to segregation or separation of constituents are to be expected according to the authors. Improvement in mechanical properties up to the values obtained from static cast test bars may be expected.

In tin-bronze alloys centrifugal

(*Concluded on page* 186)

NONE BETTER

MELTRITE PIG IRON

Exactly What the Name Implies

More USED than Any Other Merchant PIG IRON—

Such Preference Must Be Merited

"We're Hurrying to Market"

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PICKANDS MATHER & COMPANY

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IRON ORE PIG IRON COAL COKE

HAUSFELD
METAL MELTING FURNACES
FOR
BRASS—ALUMINUM—MAGNESIUM
AND ALL OTHER NON-FERROUS
METALS AND ALLOYS
GAS OR OIL FUELS

TILTING AND NON-TILTING TYPES
SINGLE AND MULTIPLE BURNERS
AUTOMATIC PROPORTIONING SINGLE VALVE
CONTROL ASSURES UNIFORM RESULTS WITH
MAXIMUM ECONOMY OF OPERATION.

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Concluded from page* 184)

castings have considerably improved properties over static castings because the latter invariably contain dispersed porosity due to shrinkage or gas or both. Greatest improvement in properties was obtained with phosphor bronze because the metal-mold reaction produces gas porosity and results in static castings having low density. Centrifugal pressure increases density markedly and more rapidly than is explainable by simple compression effect. Thus, there is no reason why the properties of centrifugal castings should not exceed those of a normal static test bar. For gun metal not degassed, the superiority of centrifugal castings would be greater than in the present tests using degassed metal.

Although centrifugal castings are denser the higher the speed of rotation, tensile properties do not improve continuously with speed of rotation. Distribution of eutectoid in the microstructure appears to be affected adversely by centrifugal casting and best mechanical properties are obtained at moderate speeds. Annealing of tin bronze castings to dissolve the the eutectoid results in greater improvement in mechanical properties than in static castings, and the improvement is greatest at the highest speeds of rotation. Leaded gun metals suffer only slight segregation of lead in centrifugal casting, but annealing has less benefit in those alloys.

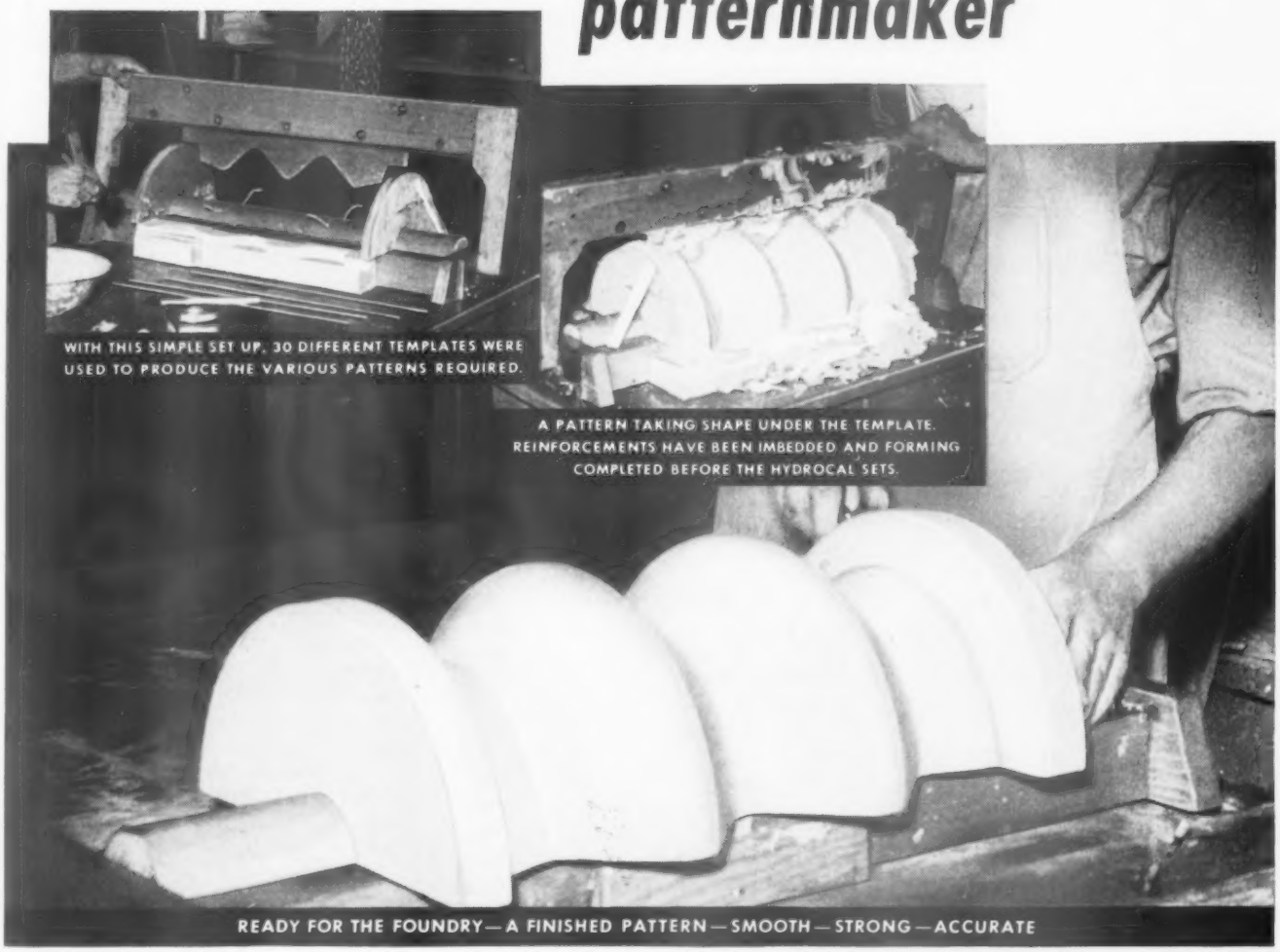
Book Review

Management Leader's Manual paper, edited by James O. Rise and M. J. Dooher, 192 pages, published by American Management Association, 330 West 42nd St., New York 18. Price $3.

First of a series of handbooks on improvement of individual and group relationships in the nation's business structure, has been written jointly by business, scholastic and government authorities on personnel management and industrial relations. Designed primarily for operating executives, supervisors and foremen, the book has been compiled to promote wider understanding of managerial problems and techniques, particularly in the field of human relations.

Seven sections deal with the management leader's human relations responsibilities, management leadership in a democracy, interviewing and counseling techniques, and means of diagnosing organization problems. Also included is a section of tests to determine qualifications for management leadership.

How HYDROCAL* helped a Pennsylvania patternmaker



WITH THIS SIMPLE SET UP, 30 DIFFERENT TEMPLATES WERE USED TO PRODUCE THE VARIOUS PATTERNS REQUIRED.

A PATTERN TAKING SHAPE UNDER THE TEMPLATE. REINFORCEMENTS HAVE BEEN IMBEDDED AND FORMING COMPLETED BEFORE THE HYDROCAL SETS.

READY FOR THE FOUNDRY—A FINISHED PATTERN—SMOOTH—STRONG—ACCURATE

The requirements . . . patterns for 30 steel rolls for corrugating sheet metals . . . one pattern per roll . . . *plus* accuracy, and quick delivery.

The answer . . . HYDROCAL B-11 Super Strength Gypsum Cement . . . with results as shown above.

Investigate HYDROCAL for your jobs, send for descriptive bulletins today. Then try these high grade, versatile materials. Prove to yourself how they excel in all-around pattern shop performance resulting in complete customer satisfaction.

*HYDROCAL is a trade-mark, Reg. U. S. Pat. Off. for a super-strength Gypsum Cement manufactured by United States Gypsum Company.

United States Gypsum

For Building • For Industry

Gypsum • Lime • Steel • Insulation • Roofing • Paint

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UNITED STATES GYPSUM COMPANY
Dept. F-11-47, Chicago 6, Illinois
Gentlemen: Please send me copies of your latest bulletins as checked below

- ☐ IGL-29, Industrial Gypsum Cements for Patterns and Models
- ☐ IGL-103, How to Make Pattern Stock with HYDROCAL
- ☐ IGL-104, How to Check a Core Box with HYDROCAL
- ☐ IGL-105, How to Make a HYDROCAL Follow Board
- ☐ IGL-106, HYDROCAL Combined and Blended Shapes
- ☐ IGL-107, How to Make a Core Box with HYDROCAL

Name .....
(Please Print)
Address .....
City ..... *Zone* ..... *State* .....

READERS' COMMENT • • •

Regarding Core Oil Prices

TO THE EDITORS:

For a great many years I have been a consistent and interested reader of one of the features in THE FOUNDRY, namely, "Around Detroit." These articles have always, in my opinion, reflected careful reporting and factual data which have been useful to me as sales manager of my company.

You can well imagine my surprise on reading your current issue wherein the statement appears that core oil prices are up 300 per cent. Naturally, I have no way of knowing what the sources of information were which permitted such a deduction, but I do think you might be interested in facts taken from our own records.

There was no change made in our prices from June 2, 1944, until July 10, 1946, when OPA controls were removed. Reflecting increases in our raw material costs, prices were raised four different times between July 10, 1946, and Jan. 23, 1947. But the average markup in our core oils during that time was 66 per cent. During that time there was a shortage in some raw materials, but at no time was any customer asked to pay such a fantastic mark-up as has been mentioned.

Furthermore, in the interest of careful reporting, it ought to be mentioned that our core oil prices have been reduced three times since Jan. 23, 1947, and every single foundry with whom we do business has had the benefit of these reductions.

At present, the prices on eight of our most popular grades show an average selling price of approximately 90 per cent over prices paid in 1939. So much for the statement that core oils are up 300 per cent.

L. P. ROBINSON
Director of core oil sales
Werner G. Smith Co.
Cleveland

Meeting the Coke Shortage

TO THE EDITORS:

You may be interested in a portion of a letter recently sent to carload buyers of foundry coke.

Because of the critical coke shortage—which will undoubtedly continue for some time—THE FOUNDRY is currently stressing the necessity of economy in use of foundry coke and many methods to that end, drawn from experiences all over the country, are being publicized by that magazine.

One other avenue of possible relief is in the use of smaller sizes of coke to extent practicable. The standard foundry coke is 3 in. up in size. The next size, egg, 3 x 2 in., is commonly used for gas making, chemicals, and various industrial purposes.

It occurs to us, though, that this egg grade, 3 x 2 in., could be increasingly used, as it is now by foundries with small cupolas and to some extent by other foundries in position to mix a proportion of the 3 x 2 in., with their current receipts of 3 in. up.

A. W. VOGTLE
Vice President
DeBardeleben Coal Corp.
2201 *First Ave.*
Birmingham 3, *Ala.*

Questions Theory Offered

TO THE EDITORS

In the June issue of THE FOUNDRY an article appeared which was entitled, "Why Metal Penetrates Cores and Molds," by Maj. Donald M. Bachelor, Army Ordnance Department, Washington. The author solves the problem in question but is his theory on penetration conclusive? Why hydrocarbon gases should deposit carbon in one sand and not in another is not quite clear.

It is well known that a sand with lower fusion point can give better results than a sand with higher. The reason is that the first sand grains will fuse together and build up an unpenetrable wall, while the sand with high fusion point will remain porous. This might explain why adding iron oxide to the sand improves the castings.

It is also known that sand with high permeability has higher thermal conductivity than sand with low permeability. This may be the reason why the No. 50 silica sand cracked and fins were formed on the casting. To lower the fusion point of the sand does not seem to be the right way to go, at least in a steel foundry. In the foundry with which the writer is connected excellent results were obtained with very coarse silica sand and a zircon wash composed of zircon, sand, bentonite, linseed oil, sulphite lye and water, prepared according to the manufacturer's instructions.

A FOREIGN READER

Editor's Note: Maj. Donald M. Bachelor, author of the article "Why Metal Penetrates Cores and Molds," replies to the letter above:

"The carbonaceous deposition in the Lake Michigan and Bridgeport sands was less pronounced because of the oxygen supplied by the natural iron oxide coating of these sands.

"A detailed examination of the sand removed from the surface of the cored cavities of each of the experimental castings disclosed no fusion of the sand grains.

"The effect of permeability was investigated and actual tests disclosed that it was not a contributing factor (as described in the basic article).

"It was because of the inability of core washes (including zircon washes) to resist this type of metal penetration that attention was focused on the core itself and the experimentation on the uncoated cores conducted.

"Since many steel foundries in this country have adopted iron oxide there would appear to be little doubt as to satisfactoriness of performance."

Flux Was Potassium Nitrate

TO THE EDITORS:

The question and answer concerning gases in bronze, published on page 133 of the April 1947 issue of THE FOUNDRY indicates that some confusion exists among readers on the oxidizing flux described in the article "Pressuretight Phosphor Bronze Castings" by Lambert and DePierre in the November 1946 issue of THE FOUNDRY. The following information is forwarded to clear the confusion.

The flux used in the article by Lambert and DePierre consisted entirely of potassium nitrate. Powdered potassium nitrate was melted and cast into ingot molds. In this manner solid potassium nitrate was obtained for adding to the melts. No copper oxide was used in the flux selected by Lambert and DePierre.

VINCENT DEPIERRE, Metallurgist
U. S. Naval Gun Factory
Washington

Safety Needs Emphasis

TO THE EDITORS

Your editorial in the October issue of THE FOUNDRY is excellent. I think that the strengthening of accident prevention programs in foundries is certainly an industry-wide project, and, as your editorial points out, its achievement would be of great value in developing better places to work.

It has often seemed to me that foundry managements are at a loss as to how to go about making a foundry a good place to work. Safety programs can be created for any size shop, and I think they provide the most simple and direct start in many foundries for developing "good" places to earn a living. I do not be-

(*Concluded on page* 190)

design and production engineers'

ACME ALMAG 55 and 35

data sheet

High Tensile Aluminum Casting Alloys

ACME ALMAG 55 (heat treated)

PROPERTIES	MINIMUM	TYPICAL
Tensile strength, p.s.i.	50,000	55,000-60,000
Yield strength, p.s.i.	28,000	32,000-35,000
Elongation, 2"	16%	20% to 30%

COMPOSITION	PERCENT
Magnesium	10.0 to 11.5
Elements employed to obtain special properties	.2 to .4
Aluminum	Balance

ACME ALMAG 35 (as cast)

PROPERTIES	MINIMUM	TYPICAL
Tensile strength, p.s.i.	33,000	38,000-41,000
Yield strength, p.s.i.	15,000	18,000-21,000
Elongation, 2"	7%	10% to 15%

COMPOSITION	PERCENT
Magnesium	6.0 to 8.0
Elements employed to obtain special properties	.4 to .95
Aluminum	Balance

NOTE: Almag 55 shows tensile increase, elongation decrease on aging. Almag 35 shows practically no change.

ACME ALMAG 55 . . . strength comparable with cast or malleable iron and mild steel castings. Offers a combination of advantages never before possible . . . including beauty, machinability, and high corrosion resistance. Recommended for a wide range of uses where high strength and light weight are desired.

ACME ALMAG 35 . . . strength comparable with best previously available aluminum casting alloys but without the necessity of heat treatment. Has all the advantages required of a good alloy. Especially recommended where heat treatment is too costly or unavailable. Ingots or castings.

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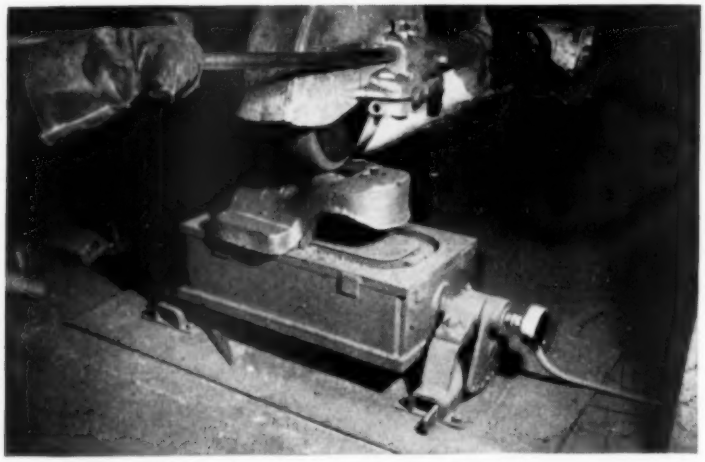

. . . with DINGS Hold-Tite MAGNET!

Here's a new time and labor-saving device which already has been applied widely in leading foundries for holding castings during swing grinding. Where castings are too heavy for hand grinding but must be locked in position for swing grinding, this magnet is the answer. Set the casting on the magnet, grind it, turn off the power to the magnet and remove the casting. Holds castings of any shape absolutely secure, eliminates wedging, blocking or clamping, saves time, speeds up the work.

Completely flexible, holds all shapes of castings, nothing to get out of order. Time studies at a large steel foundry prove 25% labor saving. MADE IN TWO SIZES: magnet face 16" x 29½" or 16" x 16". With or without tilting trunnions. Operates on 115 or 230 volts D.C. Available with hand or foot switch.

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Check these features

- Simple foot lever permits easy tilting to seven positions.
- Low operating cost—only 400 watts for small size — 600 watts for large size.
- Wound for continuous duty with glass insulated wire.
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Dings MAGNETIC SEPARATION HIGH INTENSITY

World's Largest Exclusive Builder of Magnetic Equipment

(*Concluded from page* 188)

lieve there is as much to be gained through the expenditure of dollars as there is through the development of the attitude you mention.

It could be that the success of the foundry industry in producing better places to work could be evaluated by its safety record. I hope that some day, not too far in the future, you will be able to write another editorial recounting the progress that has been made since October, 1947.

RALPH R. MEIGS
Assistant Vice President
Liberty Mutual Insurance Co.
Boston

Apprentices Available

TO THE EDITORS:

Between now and Christmas time 1947, we will graduate five young men from our patternmaking department. Four of them will be willing to work elsewhere than in the Twin Cities, which is the reason for this letter.

These four men will be available some time between Oct. 15 and Dec. 15, with training complete enough for them to be considered advanced apprentices with credit of approximately two years or more on their apprenticeship. The reputation of our public vocational school as a trade preparatory training institution for patternmaking can be checked by communication with pattern shop membership of the Twin City Chapter, American Foundrymen's Association.

What arrangements can we make with THE FOUNDRY to acquaint pattern shops outside of Minnesota with the opportunity of obtaining well prepared patternmaking apprentices with advanced standing?

H. W. TEICHROEW
Trade and Industrial
Educational Coordinator
St. Paul Vocational School
St. Paul, Minn.

Prepares Standards

Committee E-7 on Radiography of the American Society for Testing Materials is preparing radiographic standards for steel castings to be available shortly. Standards will be arranged in two books, one for x-ray and the other for gamma-ray. Both will contain 31 standard negatives for use in comparison with radiographic negatives on steel castings. They will be made available in looseleaf binders to provide for substitution of new standards or insertion of additional standards.

RailMaster 5-Ton MonoRail System saves 31 hours for each car unloaded at this plant.

One man now unloads a car in 5 hours where formerly 3 men took 36 hours.

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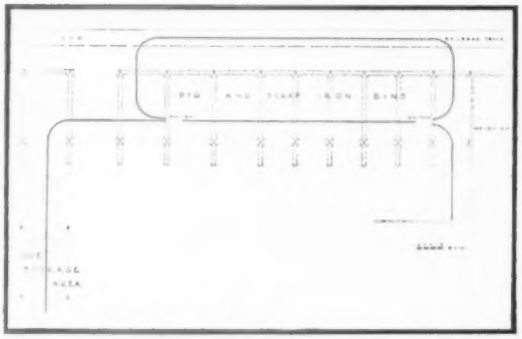
American MonoRail System also used for storing copes and breaking scrap with 1000 lb. steel ball.

At this plant it formerly took 3 men appoximately 36 hours to unload and store a car of pig or scrap iron. With the American MonoRail system one man now accomplishes the same job in 5 hours

The savings in time is just part of the story since the system is used for breaking scrap as well as storing copes.

American MonoRail engineers often prove marked reduction in handling costs. They have hundreds of cases from which to draw. A consultation can be quickly arranged.



SEND FOR BULLETIN C-1. A 56-page book showing successful applications of American MonoRail Systems.

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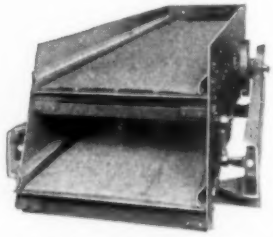
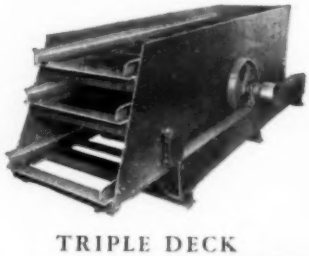


DOUBLE DECK



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(*Continued from page* 192)

lations who believe everything they read in the papers. They never give a thought to checking the accuracy.

From constant repetition the boys are as familiar as I am with the doings and sayings in the bird and animal world. They like all the stories, but through a natural streak of perversity, probably inherited from hairy ancestors who practiced the little amenities of social life with sword and battle axe in the field back of Tara's Hall, the boys never can agree on the same story at the same time.

This night while one champion loudly proclaimed his intense interest in the Three Bears, the second champion just as loudly declared that the only story he wanted to hear was the gory one where the wolf chewed up and swallowed the old grandmother, and came very near performing the same kindly office for Little Red Riding Hood. Each hero had his little book, open at the proper page. They can't read the words, but they recognize every picture, even when the books are held upside down.

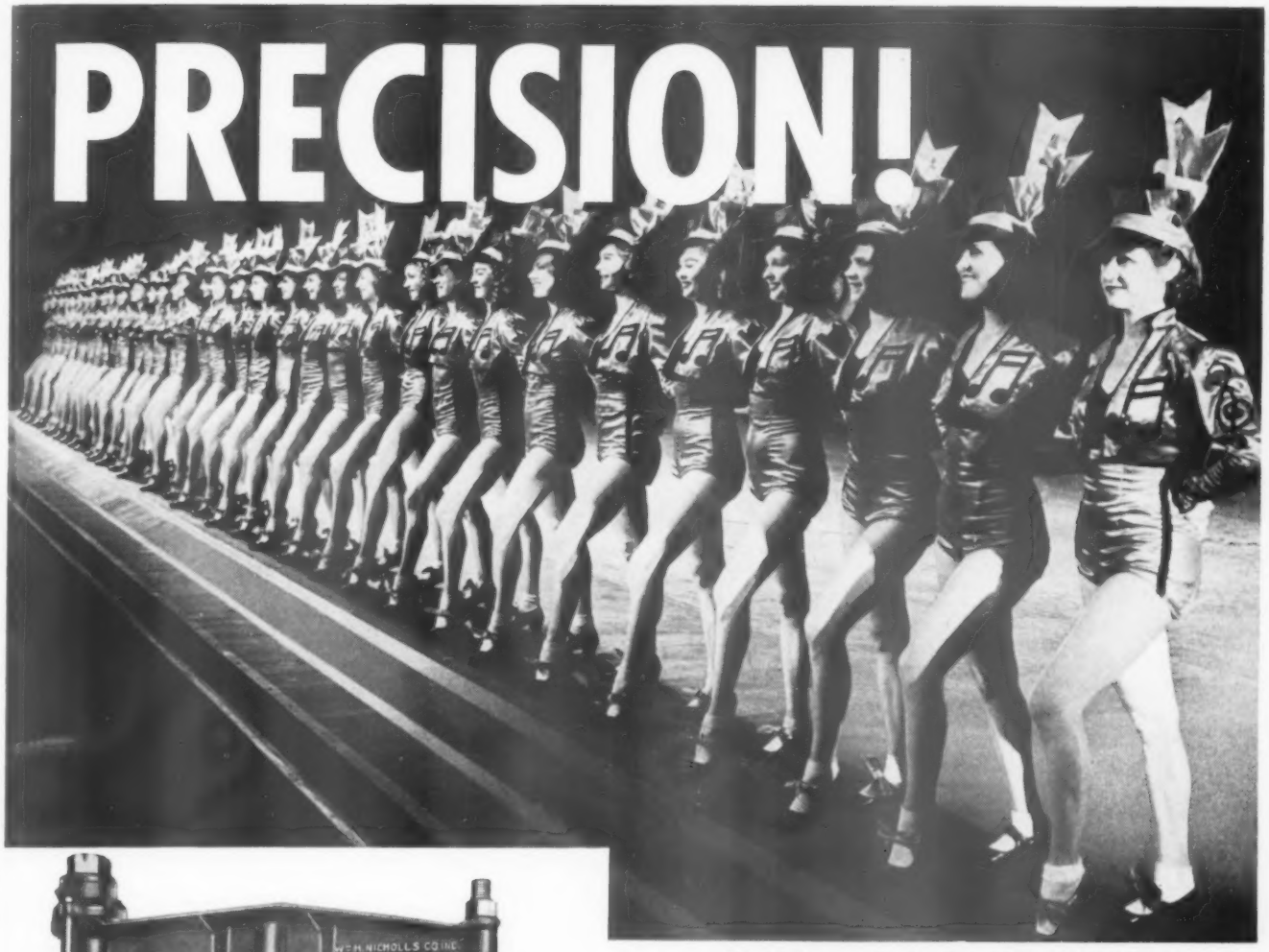
After trying various methods to remove any taint of partisanship or favoritism, I tossed both books on top of a convenient bookcase and told the boys my own version of the Thrilling Adventures of The Three Little Pigs, or When Playing With a Wolf, You have To Get Up Early in the Morning. One lad virtuously directed attention to the fact that he and his brother always were the first to wake up in the morning. As if I didn't know!

I pointed out as calmly and logically as possible that while the early rising habit was desirable and commendable in itself, that did not mean they had to rise at the first streak of dawn, go around in young Cupid's costume knocking at every door, and announcing in a piercing voice to one and all that they were all ready for a hearty go at the breakfast.

When I told them at the beginning of the story that Old Mother Pig, sick and tired of their antics, had thrown her three little pigs out on their ears and told them that from that day forward they were on their own and would have to fend for themselves, the lads deserted me in a body and ran to their mother. They wanted to be assured none of that kind of dirty work was contemplated at the local crossroads. She informed them gravely that she had the subject under consideration. Unless they mended their ways—ways duly itemized—she might—well, she suggested it might be a good thing if

(*Continued on page* 196)

PRECISION!



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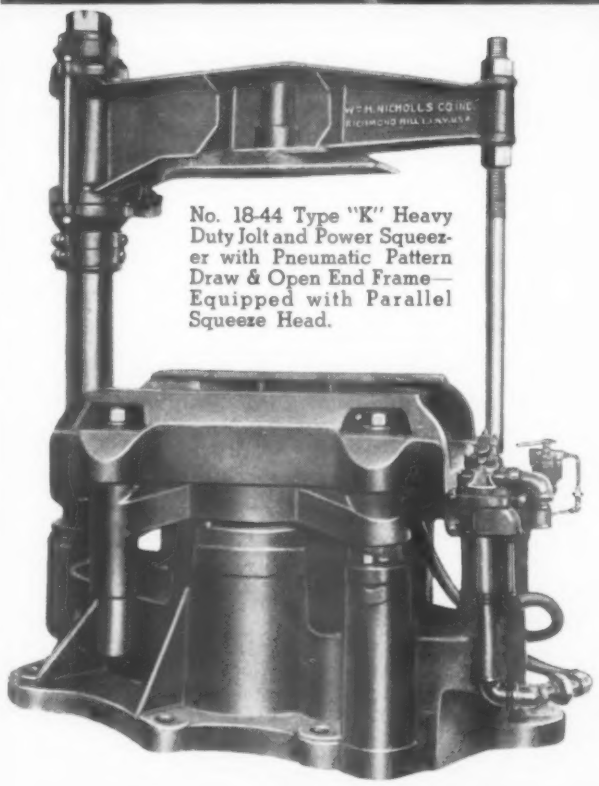

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(*Continued from page* 194)

they were to think it over.

Slightly chastened, they returned to the perches on my knees and kept fairly quiet while I outlined the adventures of Wickey, Wackey and Charlie. For these indeed were the names of the three little pigs. Wickey built a straw house and the wolf came along. After due process of law and fair warning he huffed and he puffed and he blew the house down. Then he dragged little squealing Wickey off to his cellar where he pickled him for the winter in a nail keg. Not satisfied with the manner in which the wind was roaring outside, a feature to which I directed their attention as fairly indicative of the wolf's efforts, they insisted I

Safe if his anchors don't drag

should give a personal demonstration.

By the time I had huffed and puffed into Wackey's house of sticks, and practically blown out every fuse in the circuit in vainly huffing and puffing against brave little Charlie's brick house, I was, as I intimated at the beginning of this veracious chronicle, all in, down and out. I welcomed the peace and comfort of the old chair and my own company. 'Twas a positive pleasure to listen to the roaring wind, the vain huffing and puffing of old Boreas to blow the little cot down around my ears.

When I mentioned the incident to Bill a few days later he admitted that it was indeed a trying ordeal. Quoting his respected uncle Malachi he said, "Wan 3-year old can wear out three strong min. Whin y'er up agin two of 'em, ye ain't got a chance. So far as I can see me bye, ye ain't long for this wor'r'r'ld!"

"Talking about your next stopping place and one thing and another."

(*Continued on page* 198)

Keep in Step with the Latest Trend in

PERMANENT MOLDS

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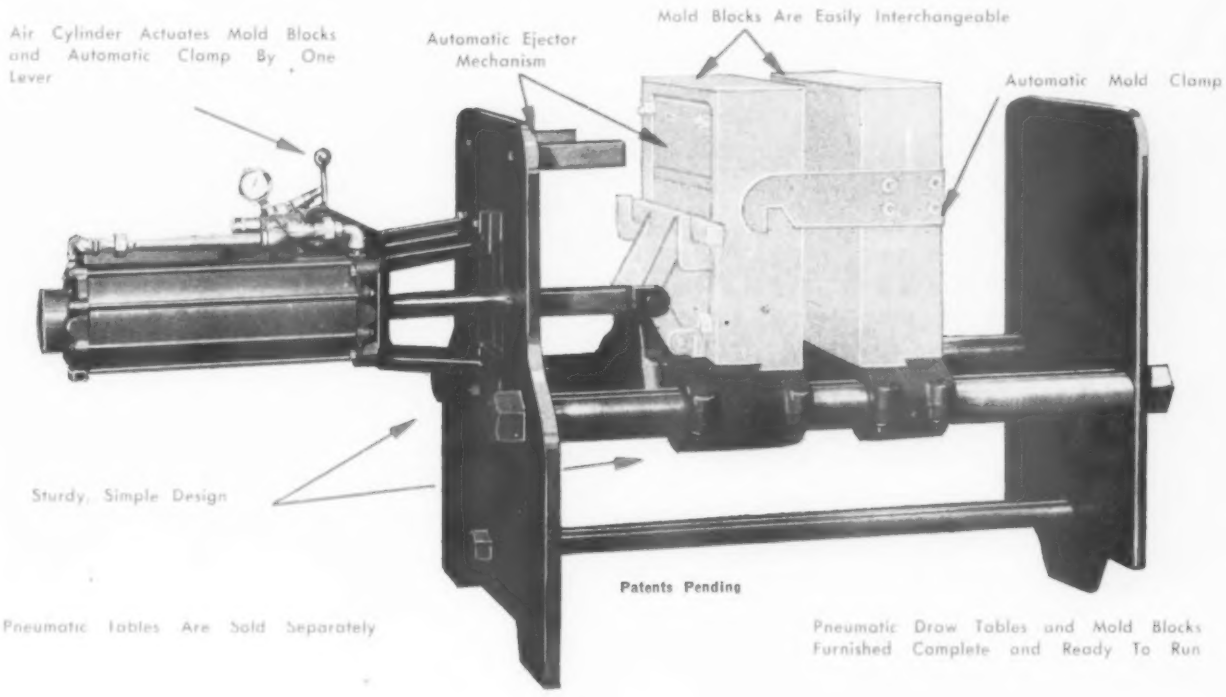
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Air operated molds save additional time and money and still give you the same advantages. Mold cavity blocks accommodating castings up to 14″ in size are easily interchangeable. Larger tables and mold cavity blocks are also available. The simple and durable design enables ease of operation and requires very little upkeep. In addition, this time and effort saving pneumatic table permits constant use. Inquire now for future production requirements.

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(*Continued from page* 196)

he continued. "I had an interesting query the other day from a citizen who wanted an expression of opinion on two points: 1—Assuming modern, fast drying sand mixtures are used, should a large mold or core be thoroughly dry to produce a good, sound large steel casting. 2—Where the molds and cores remain in the oven for several hours after they are dried, should the doors and dampers be closed tightly, or should they be opened to allow any stray moisture a chance to escape.

"On the face, these two questions bear a strong resemblance to those designed (a) to start a prolonged discussion, or (b) to stump the experts. A short-tempered umpire sensing a trap, or a large pit, might answer the questions briefly by saying 'No' to the first, and 'Leave 'em open' to the second.

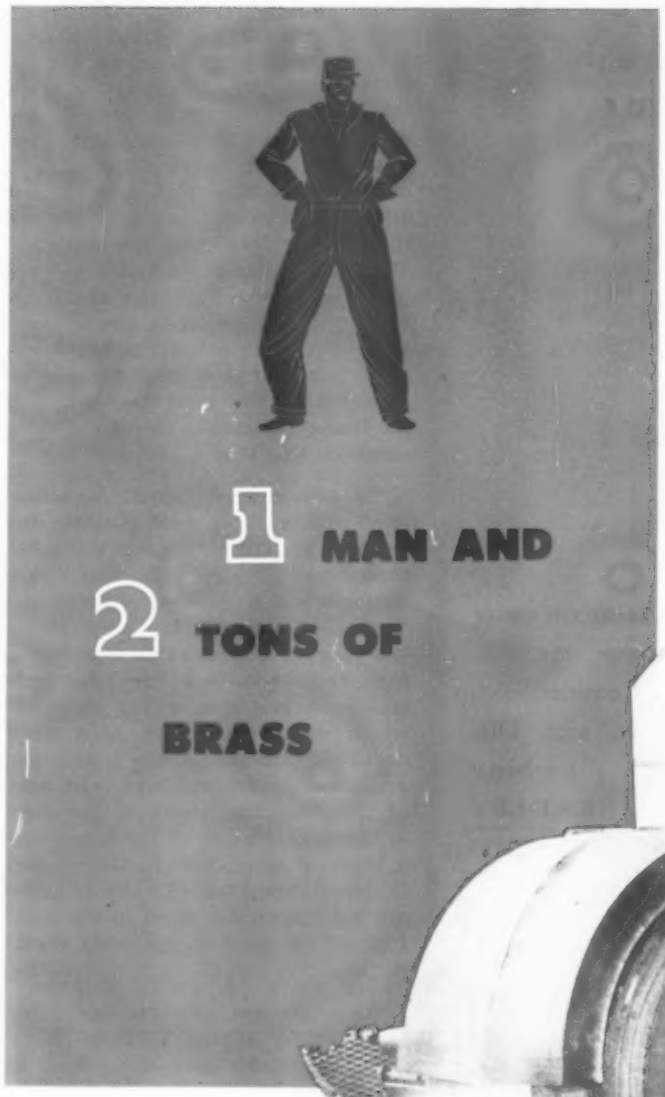
"However, assuming that the questions are asked in good faith, and with the proviso that we do not hold a card in the Sourpuss Crab & Watery Eyed Umpire Association, it is only fair to point out that answers to the questions are not in the brief yes-and-no class.

"Theoretically, a large mold or core should be thoroughly dry to produce a perfect large steel casting. The joker in the wood pile is the word *thoroughly*. Under one interpretation that means the entire body of sand in the mold or core is dried or baked all the way through, that every vestige of water has been extracted, and that the liquid portions of all binders has been evaporated, leaving only the thin oxidized films between the sand grains.

"In many ovens where large molds are stacked on a car, thorough drying is brought about automatically because the heat has to penetrate heavy iron or steel flasks. By the time the sand forming the face of the mold has been dried to a sufficient depth, the remainder of the sand in the flask also is dried. The foundryman has no choice in the matter. The mold either is thoroughly dried, or is not dry enough to receive metal.

"Molds are dried for the express purpose of evaporating the moisture content. Experience has shown that this treatment is necessary only for the sand in close contact with the casting. Therefore a more or less prolonged skin drying, where direct heat is applied to the face of the mold, is as satisfactory as where the entire body of sand in the mold is dried. This is illustrated by large molds made in pits in the floor, by

(*Concluded on page* 200)



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BRADLEY *washfountains*

(*Concluded from page* 198)

molds for ingot molds, and for pipe castings molded on end. In the pit molds, gas jets, charcoal or coke salamanders, or other devices for heating the air in the mold, dry the sand to a depth varying from 1 to 6 in. Sand outside this area is not dried. This would seem to answer the question No. 1 in the negative. Many molds for ingot molds and for pipes are dried from the inside by setting them over small gas or coke fires. The body of sand in the flasks is so thin that it is dried thoroughly even before the flask becomes hot. In these instances, the answer to question No. 1 is a positive yes.

"In a somewhat radical departure from ordinary dry sand practice, instanced in THE FOUNDRY on more than one occasion, the molds are mounted on a conveyor which carries them through an oven where the face of the mold is exposed to high and direct heat. In effect this treatment is a skin drying operation which dries the facing sand to a depth of approximately 1 in., and produces perfect castings. In each of the foregoing instances the mold is thoroughly dried in the sense that a layer of sand next to the casting is thoroughly dried. The same molds are *not* thoroughly dried in the sense that all the sand in the mold should be bone dry.

"In a general way the same line of reasoning applies to large cores, with one notable exception. Sand in the mold is outside the casting. Therefore steam or gas has an opportunity to escape. Many cores on the inside of a casting are practically surrounded by molten metal. Any moisture present converted to steam which may or may not become trapped in the metal. Although not positively mandatory in all cases, ordinary prudence suggests drying all cores thoroughly. Cores that form the outside of a mold, naturally fall into the same category as those discussed in a preceding paragraph.

"All of which adds up to the conclusion that the answer to the question: Should a large mold or core for a steel casting be thoroughly dried is yes and no. Decision depends on several factors.

"The second question: Should the doors of the oven be closed for an approximately 10-hour period after the molds and cores are dried, is of more academic than practical interest. Obviously the coring and setting up men cannot handle flasks at a temperature in the vicinity of 600° F. This is ordinary practice.

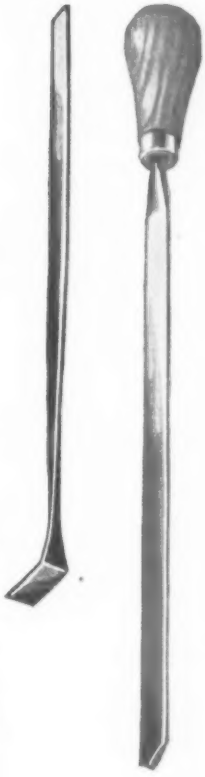
ONE PIECE FORGED TOOL STEEL

MOULDERS TOOLS

Immediate Delivery From Stock . . .

ROUND FINISHING TROWEL

Width—1½″ x 6″	$1.80
1½″ x 7″	1.85
2″ x 7″	1.90

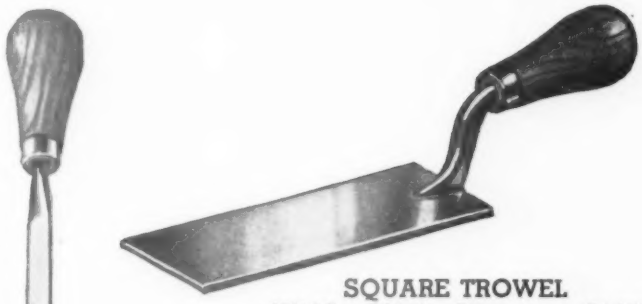


No. 40 STRAIGHT LIFTERS →

Length	10″	12″	14″	16″	18″
Width—¼″	$1.05	$1.15	$1.20	$1.30	....
⅜″	1.05	1.15	1.20	1.30	....
½″	....	1.30	1.35	1.40	$1.55
¾″	....	1.40	1.50	1.60	1.75

Special Lifter, ½″ wide x 24″ long—$2.50

No. 15 BENCH LIFTER	Width	Each
	¼″	$1.05
	½″	1.15
	¾″	1.40



SQUARE TROWEL

Width—1½″ x 6″	$1.80
1½″ x 7″	1.85
2″ x 7″	1.90

←—MOULDERS VENTING TOOL
For
Steel and Semi-Steel Foundries

Length	16″
Width—⅜″	$1.20
½″	1.35
¾″	1.50

Prices subject to change without notice. This is our complete line of tools. New tools will be added to this list when justified by demands.

No. 1
SLICK & OVAL SPOON

Width	¾″	1″	1¼″	1½″
Each	$1.05	$1.15	$1.40	$1.55

No. 5
OVAL SPOON & TAPER SLICK

Width	¾″
Each	$1.15

No. 10
TAPER & SQUARE

Width	¾″ Taper, ½″ Square
Each	$1.15

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Pattern Shop & Foundry Supplies & Equipment

Mahogany and Pine Pattern Lumber

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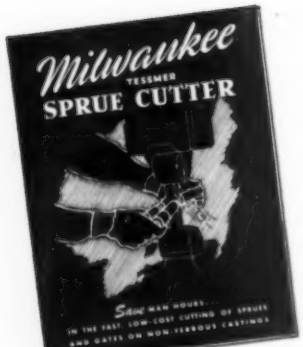
CUT CLEANING-ROOM COSTS!
STEP-UP PRODUCTION!
with the Milwaukee-
Tessmer Sprue Cutter . . .

Cutting sprues and gates on non-ferrous castings becomes a one-man operation with this machine. What's more, a skilled operator isn't needed. Any workman can learn to run the Milwaukee at top capacity in a short time.

It results in a fast, steady flow of work through the cleaning department; accumulations of unfinished work are eliminated, less storage space is required because castings are trimmed and cleaned as they come from the foundry.

With the Milwaukee, ONE SWIFT, SURE STROKE clips gates or sprues in a matter of seconds; slow, tedious hand labor is eliminated, manpower released for more important work.



All models of the Milwaukee-Tessmer Sprue Cutter are fully described in a New Illustrated Bulletin. Write for your copy.

Milwaukee
CHAPLET AND MANUFACTURING CO.
1025 S. 40th STREET • MILWAUKEE 4, WIS.

A 5131-½R

CONTROLLING COSTS

(*Continued from page* 85)

ing them at the lowest possible level.

Most steel casting foundries today are of a size which renders complete personal supervision by one executive practically impossible. The only reliable way, therefore, by which executives can judge the efficiency in their organization is through a system of dependable cost and statistical reports, some of which should be submitted daily. Foundries must be operated and cost controlled on a day-to-day basis; hence, the need of an adequate cost system.

One of the objections advanced by foundrymen against installing an adequate cost system is the feeling that their particular foundry is different from all others, that no system which could be operated in a practical manner would give them true costs. This is a poor excuse. True, some lines of casting production lend themselves more readily to the determination of costs than others, but it is also true that no line is so complicated but that a system can be devised and operated in a fairly simple and practical manner which will give reasonably accurate results.

Objection Is Not Sustained

Another objection advanced has been the expense of operation. Many foundrymen feel that a cost system means endless details, red tape and the employment of a huge number of additional clerks. Yes, some additional clerical labor is usually required, but not to the extent that most foundrymen believe. The results obtained more than pay for themselves. It has been my personal observation that in most foundry offices not today properly organized, sufficient unnecessary work is performed which, if eliminated, could cut to a minimum any extra labor of operating a good cost system.

Another group of foundrymen without adequate cost records give the excuse that they know what their castings cost "just by looking at them." Many of these foundrymen have since changed their minds and have installed adequate cost systems, others are either struggling along or are out of the casting business. One may, from his knowledge of the work involved in producing a certain casting, have an approximate idea of what a certain casting will cost to produce, but at best his information is no better than a guess and guesswork today has no place in modern

(*Continued on page* 204)

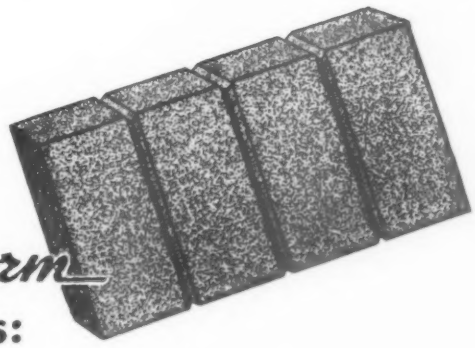
--Last place I worked they had NO TROUBLE MACHINING CASTINGS

By using Famous Cornell Cupola Flux with each charge of iron, you will make machining definitely easier and smoother, due to the fact that it causes rapid elimination of slag and other impurities from molten metal, aids greatly in reducing sulphur and makes metal freer flowing. You will pour castings that are stronger, cleaner, more uniform in metal structure—chilled sides, hollow centers, hard spots, etc. are greatly reduced.

Famous CORNELL CUPOLA FLUX (METAL CLEANSER)

CLEAN CUPOLAS, CLEAN DROPS, LONGER BRICK LIFE are other advantages in using Famous Cornell Cupola Flux. By forming a glazed or vitrified surface on brick over and above melting zone, and by reducing erosion, Famous Cornell Flux increases life of cupola lining. Furthermore, practically no picking out is necessary as "bridging over" has been eliminated by this flux.

Write for Bulletin 46-B



Scored Brick Form HAS THESE ADDED ADVANTAGES:

You can flux a charge of iron in a few seconds—correctly. Simply toss one brick into cupola for each ton charge of iron or break off a briquette (quarter section) for each 500 pound charge. NO WASTE! Famous Cornell Cupola Flux does not blow out with the blast—it stays in melting zone until entirely consumed.

The CLEVELAND FLUX Company

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Manufacturers of Iron, Brass and Aluminum Fluxes Since 1918

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Famous CORNELL ALUMINUM FLUX

Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.

Famous CORNELL BRASS FLUX

Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.

Famous CORNELL LADLE FLUX

Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

or ask

YOUR LOCAL FOUNDRY SUPPLY HOUSE

for

2-DAY DELIVERY on Combs Riddles.

TYPE V, illustrated above, is priced at $210.00 complete, and is one of several available types.

COMBS Gyratory Foundry Riddles and equipment are distributed by Foundry Supply Houses throughout the United States and Canada . . . ask your supply house for details on our wide range of sizes.

Great Western Manufacturing Company

LEAVENWORTH, KANSAS

(*Continued from page* 202)

business.

A production center cost system which furnishes data to compute costs by individual pattern numbers will not run itself; neither will it in itself reduce costs nor increase efficiency. This is strictly up to the foremen and top management.

A good cost system will give valuable information, but if this information is not properly used, the cost system is a waste of money expended. On the other hand, if the information is properly used, the cost system becomes a valuable asset.

Let me state at this point that a cost system should be made to fit the operating conditions of the foundry and not the foundry to fit the cost system, and before any attempt is made to install or revise a cost system a careful examination of the plant practices should be made. It should always be remembered that a cost accounting system, if it is to work smoothly and satisfactorily, must be simple and practicable and co-ordinate with plant practices, and must have the full backing of the entire management of the company. In order to produce the best results the co-operation of the whole force is necessary, particularly that of the superintendent and foremen.

Should Know Costs

Sound trade conditions throughout the steel casting industry demand that each foundry know its true costs, that it know its profitable and unprofitable jobs and that it obtain a reasonable and fairly equal profit on each class of work produced.

The form of competition to which members of the steel casting industry *do not* object is the competition of a foundry which knows exactly what its castings cost by patterns; and, whose prices, if low, are low because of advantages actually secured through volume or by reason of more efficient methods of production.

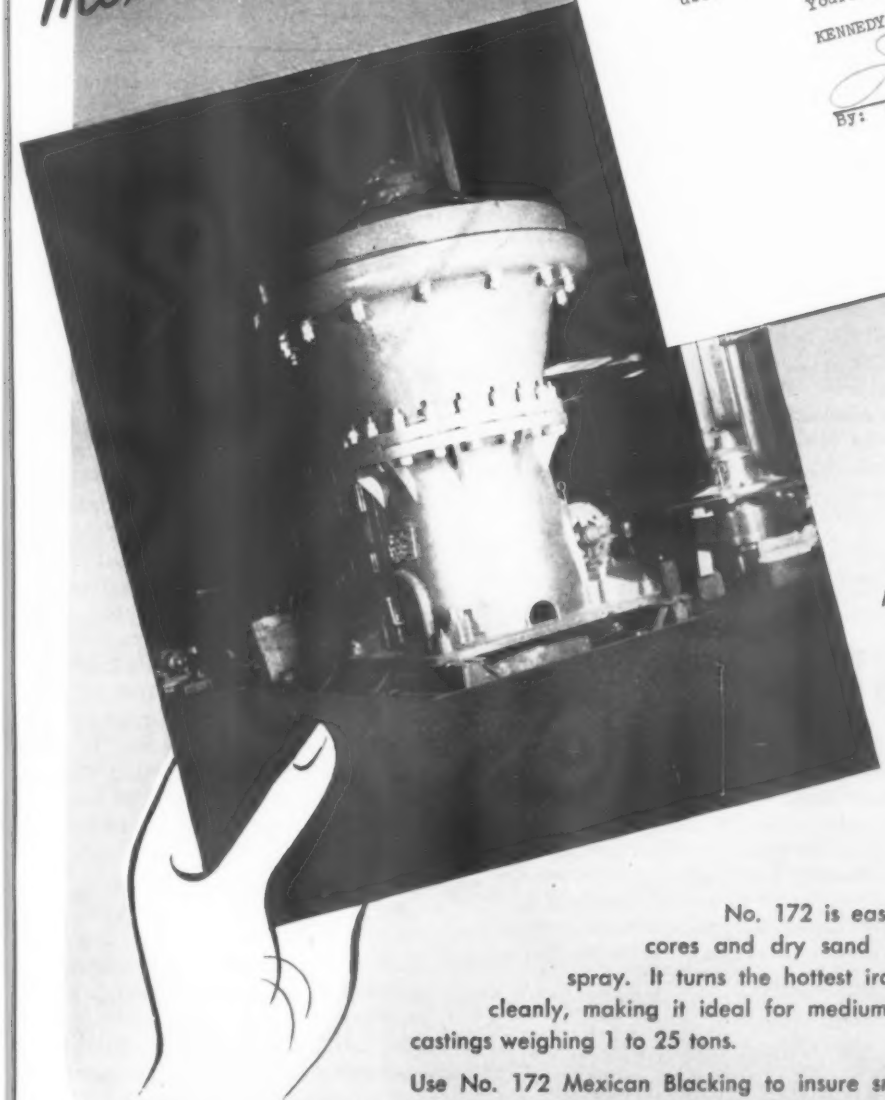
The competition which is most dreaded is that of the foundry which, having *no* proper knowledge of costs by patterns, sets prices which preclude the possibility of there ever being an adequate profit for anyone.

It is my belief that only those companies will go forward in the future which take proper steps to maintain adequate cost systems and which put cost control back to work in the plant, on the sales front, and in the general office.

In their cost findings foundries must also recognize and distinguish

(*Continued on page* 206)

We are well pleased with No. 172 Mexican Blacking



KENNEDY-VAN SAUN MFG & ENG CORPORATION
DANVILLE, PENNSYLVANIA

The United States Graphite Company
1621 Holland Ave.
Saginaw, Michigan

Gentlemen:

"The large castings -- the spider, and top and lower shells -- shown in the photograph of our No. 36 Kennedy Gyratory crusher were molded in our foundry using No. 172 Mexican Blacking. Note the resultant fine finish.

"We are very well pleased with the results obtained in using your product and we would be glad to recommend it to any other foundry for this particular application and use."

Yours very truly,
KENNEDY-VAN SAUN MFG. & ENG. CORP.
By: L. V. Murray, General Supt.

This excerpt of a letter from Mr. L. V. Murray, General Superintendent of the Kennedy-Van Saun Manufacturing and Engineering Corp., to The United States Graphite Company testifies to the excellence of No. 172 Mexican Blacking. A high quality wet blacking ready mixed with bond, No. 172 is easily and smoothly applied to cores and dry sand molds with swab, brush or spray. It turns the hottest iron and allows sand to peel cleanly, making it ideal for medium, extra large, and pressure castings weighing 1 to 25 tons.

Use No. 172 Mexican Blacking to insure smoother, cleaner castings in your foundry. Write today for complete information.

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

WHERE FOUNDRY DUSTS OR FUMES ENDANGER HEALTH

—here's comfortable, approved breathing safety!

M·S·A Clear-Vue

DUSTFOE

RESPIRATOR

Compact, light in weight, built for hard service, the popular Clear-Vue Dustfoe Respirator is welcomed by the foundryman for its top wearing comfort as well as complete All-Dusts respiratory protection. Formable aluminum facepiece with flexible cushion enables individual shaping to the face—transparent plastic filter container shows filter condition without disassembly—inexpensive filters are readily replaceable as needed. U. S. Bureau of Mines approved. Write for Bulletin CM-8.

M·S·A "Comfo"

METAL FUME

RESPIRATOR

Harmful metal fumes are filtered effectively from inhaled air by this specifically-designed respirator. Large-area twin filters are especially processed for maximum efficiency, protected by sturdy aluminum containers—Comfo Cushion Facepiece assures gas-tight fit on any face without binding. U. S. Bureau of Mines approved. Bulletin No. CR-17.

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(*Continued from page* 204)

between (a) production jobs and (b) tailor-made jobs; and both types of jobs should be made to stand on their own feet from price standpoint. Hence, the need for adequate casting cost data *by patterns.*

All foundries are interested in getting lower costs because lower costs places them in a better competitive position. To secure such costs, it is necessary to strive for maximum efficiency. To get maximum efficiency one must have efficient labor and supervision together with efficient methods and efficient equipment. The cost of operating and maintaining equipment must be kept to a minimum, and the number of units produced per man-hour with the equipment must be kept at a maximum through efficient methods, efficient labor, and efficient equipment.

Investigate Variations Immediately

The chief value of cost accounting lies in cost camparisons. Not only should the current month's actual operations be compared with previous months' but also a comparison should be made of current operations with predetermined standards and predetermined monthly budgets. Variations should be investigated immediately.

Operating comparisons should be made, wherever practical, by production centers. Top management, in all fairness to its supervisors and workers, should inform the supervisors and the workers prior to the beginning of each month what it expects of their production centers. It should set a fair goal in the form of a budget, by production centers, both of production required from the production center and the amount of money that may be expended for labor, material and expense, in getting the required production. Proper predetermined standards and budgets make for efficient production centers. It keeps the workers happy and the supervisors on their toes.

Most companies at least once a year take a physical inventory of their raw materials, and in-process and finished castings. In recent years progressive foundries have extended their inventory taking to include periodic inventories of their supervision and manpower to determine whether or not they have the right men in the right places; they are also taking an inventory of their methods and of their machines and equipment, from time to time, to determine the

(*Continued on page* 208)

on land, at sea, or in the air

MOLYBDENUM STEELS improve

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In jet-propulsion and other high-performance engines and turbines . . .

In the most advanced developments of Diesel power . . .

In gears, bearings, and shafts and in other mechanical parts where stress, temperature, or chemical condition are extreme . . .

In valves and wheels and rails under heaviest wear . . .

In high-pressure tubing, in electronic tube filaments and welding rods . . .

In a diversity of critical applications, Molybdenum and Molybdenum alloys are becoming as well established as they have long been in the manufacture of cutting tools. And Transportation in its various modes and forms opens one of the great fields of usefulness for the properties in which Molybdenum and its alloys are known to excel. High melting point, high wear resistance, high strength and hardness at high temperatures, high modulus of elasticity, and superior heat conductivity are among the properties obtained.

The Molybdenum Corporation, as a supplier of alloying materials, is happy to be consulted on any metallurgical or practical problem concerning Molybdenum, Tungsten, or Boron.

AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

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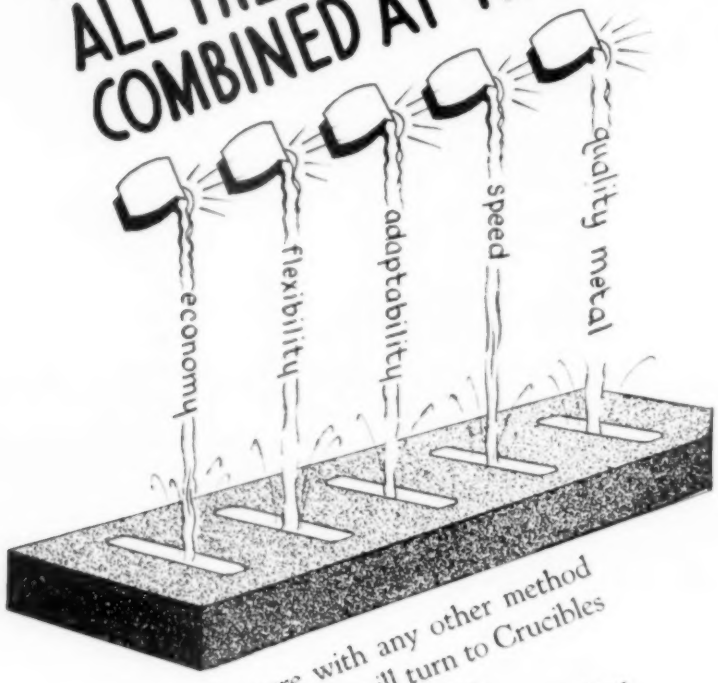
ONLY IN CRUCIBLE MELTING DO YOU GET ALL THESE ADVANTAGES COMBINED AT THEIR BEST



Check feature by feature with any other method of nonferrous melting, and you will turn to Crucibles every time. There is no second choice.

Crucible Melting means Economy, Flexibility, Adaptability, Speed, Ultimate Satisfaction. It is at once the old method and the most modern, for Crucible Melting brings your foundry up-to-date, gives it every competitive advantage no matter who your competitors—puts you on a par with any plant big or small.

Get more heats out of your Crucibles; send for the Crucible Melters' Handbook; mailed free. Write today.

CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK 6, NEW YORK

(*Continued from page* 206)

adequacy and efficiency thereof.

Efficiency must not stop at the shop; it must spread throughout the office and sales department. Even the top ranking officers of a foundry may do well to occasionally take an inventory of themselves to determine whether or not they are growing stale and becoming less valuable; and, if so, why.

Progressive foundries today in order to lower their costs have capable men in complete charge of all methods, time studies and piece rate and allowance setting, with full authority and responsibility. These methods men have saved their companies many times their salaries each year. Don't spend money on method studies, however, without first having an adequate production center cost system.

Get Joint Participation

In setting up standards and projecting monthly budgets and making any revisions thereto, it is essential to get joint participation between (a) top management, (b) cost department, and (c) the man who has to operate under the budget.

A good cost department plays an important part in the budget preparation and follow-up. However, the cost department should not act as, nor be regarded as, a policeman. Its function should be to furnish adequate, concise, and understandable reports, to direct attention to those costs which are out of line. Top management through the president or other senior executive must shoulder the responsibility of finding out *why* the costs are high and out of line, and insist that corrective action be taken.

Production center cost accounting places responsibility where it belongs, namely, on the foreman of the production center. Too often, management talks in terms of departmental costs and hence gets no results from cost control because they should be talking in terms of the costs of each of the production centers making up the department. Some production centers in a department may be making money and others losing money.

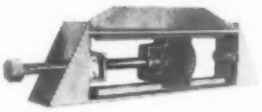
A foundry whose molding department, for example, consists of three production centers, namely, squeezer machines, rollover machines and a floor, will have better cost control when it knows periodically (a) what the cost of each production center is, (b) the tons produced therein, and (c) the scrap chargeable thereto.

Each production center of the mold-

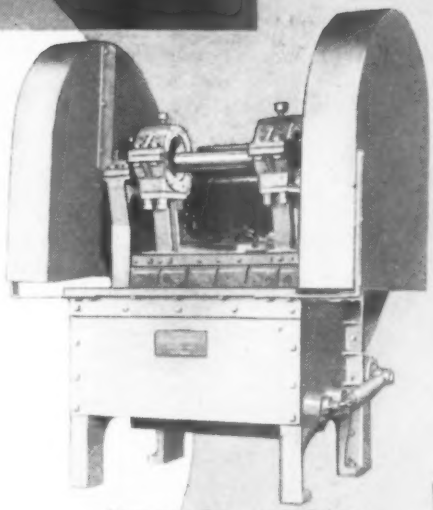
(*Continued on page* 210)

The NEW WAY to go....

TOWARD FOUNDRY PROFITS

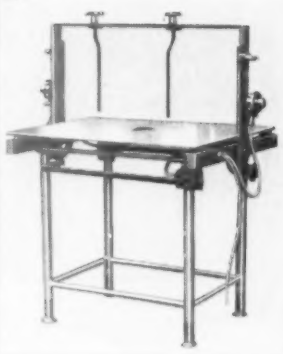


Newaygo Conveyer and Elevator Take-Ups—Self-aligning Roller, ball or plain bearings, for all standard shafts, 6" to 36" travel.

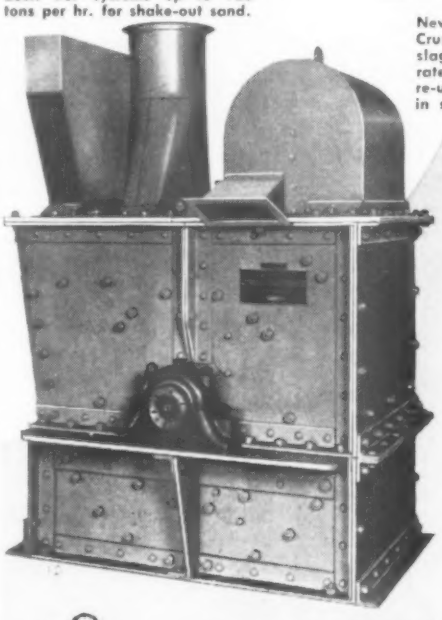


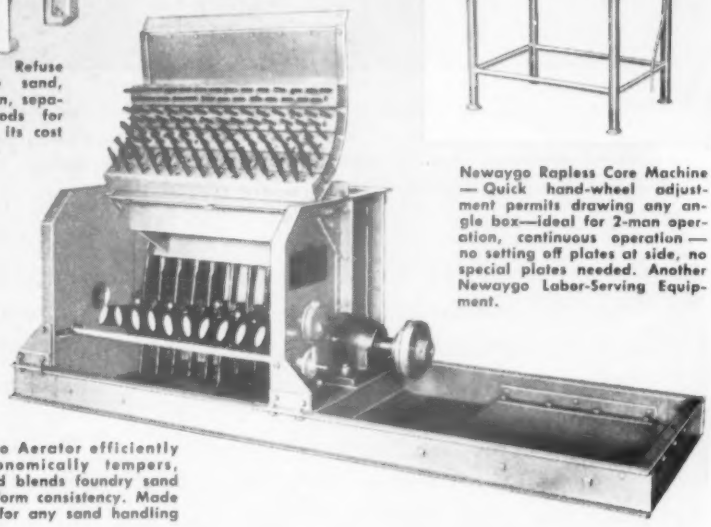
Newaygo Mill cuts costs for large users of sand. Salvages sand lumps from screens, separates non-magnetic tramp material and metal which escapes magnetic separator. All lumps reduced to proper grain size. Provision for eliminating float dust. For systems up to 120 tons per hr. for shake-out sand.

Newaygo Foundry Turntable —Standard sizes 8' to 24'. Segmental construction. Interchangeable gear sections. Variable speed drive. Underpan with plows handles spillage through grates.



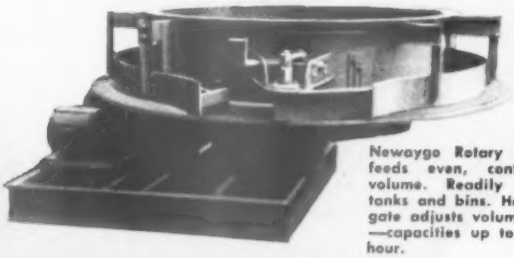
Newaygo Core and Refuse Crusher recovers core sand, slag for iron reclamation, separates gaggers and rods for re-use. Quickly returns its cost in salvaged core sand.



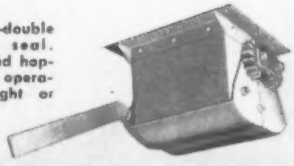


Newaygo Rapless Core Machine — Quick hand-wheel adjustment permits drawing any angle box—ideal for 2-man operation, continuous operation — no setting off plates at side, no special plates needed. Another Newaygo Labor-Serving Equipment.

Newaygo Aerator efficiently and economically tempers, cools and blends foundry sand to a uniform consistency. Made in sizes for any sand handling system.



Newaygo Rotary Plate Feeder feeds even, controlled sand volume. Readily attaches to tanks and bins. Hand crank on gate adjusts volume. Two sizes —capacities up to 75 tons per hour.



Newaygo Sand Gates—double undercut type. Tight seal. Available for all bins and hoppers. Geared for easy operation. Hand, counterweight or air operated.

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

NEWAYGO ENGINEERING CO.

NEWAYGO, MICHIGAN

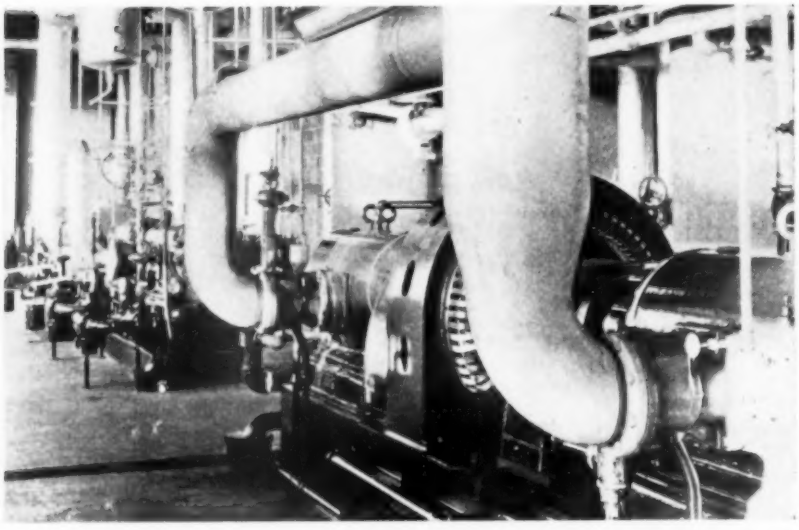
THE New Way LINE

Sand handling, cooling and conditioning equipment, mold conveying systems, reclaiming units, rapless core drawing machines.

SALES OFFICES:

IN ALL PRINCIPAL CITIES

MERCK & CO., INC.
installs
Fuller Rotary Compressors
at Elkton



Two of several Fuller Rotary Duplex Single-stage Compressors installed in the Elkton, Va., plant. Of the Units shown above, the one on the right is motor driven and the other is turbine driven. Capacity of each unit installed is 3010 c. f. m., 30-lb. pressure.

Merck: maker of Streptomycin — the modern, efficient drug. Fuller: maker of Fuller Rotary — the modern, efficient compressor. Each has its place — Streptomycin for the saving of life; Fuller Rotary for cost-saving air production.

Fuller Company is quite proud to be associated with this great project, to have had the opportunity to furnish Fuller Rotary Compressors for such a fine, efficient plant, to be able to play even a small part in this worth-while undertaking . . . the fight for life.

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C-157

FULLER
A LIFETIME OF NEW MACHINE EFFICIENCY

(*Continued from page* 208)

ing department should know its cost of (a) direct labor for molding, (b) its sand cost, (c) its pouring and shakeout cost, and (d) its production center general overhead. With such data available plus necessary production and scrap statistics, high costs are localized and responsibility fixed.

Production center cost accounting and control pays good dividends when applied to the cleaning department. To state that one's cleaning cost of castings is so much per ton is meaningless. The cleaning room, for effective cost control, should be broken down into production centers, each major cleaning operation being a production center. The direct labor cost of each cleaning production center should be determined together with the overhead applicable thereto. It will surprise many when they become acquainted with variances in the overhead rates of the various cleaning operations.

Production Centers Vary

Each foundry will have its own ideas with respect to the number of production centers it wishes to set up for cost purposes. Some may want several production cost centers in a department; others, very few. The number of production cost centers will vary with each company, and is dependent entirely upon the degree of the accuracy required and refinement necessary in the determination of true cost of jobs.

A steel foundry which does not have a cost system to determine accurately job estimates *by patterns* is doing itself an injustice and at the same time harming the industry in general. Unless companies of the steel casting industry compute their job costs by patterns they do not, in my opinion, know their actual costs, and are *guessing* when they quote selling prices.

More and more attention should be given to this matter of cost control. One sure way to get increased attention thereto is to tie in incentive payments for executives and supervisors directly to performance under a cost system. In many companies, today's thinking is getting away from overall bonuses to incentives based on production center performance in beating budgets and standards. It is not easy to develop a working incentive plan along these lines and hence the slowness in adaptation by most companies.

A simple rule, too often neglected in

(*Continued on page* 212)

"take it" from Chief Keokuk...

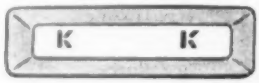
THREE SIZES
For Convenience and Efficiency

... that's KEOKUK Electro-Silvery

STEEL PLANTS

60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature melt-down. Handle by magnet.

FOUNDRIES



30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

Write today for complete information.

KEOKUK ELECTRO-METALS COMPANY

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Sales Agents: MILLER AND COMPANY, 332 S. MICHIGAN AVENUE, Chicago 4, Illinois
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You get better Ventilation with Propellairs

Above are some of the many Propellairs serving industry. Scientific, airfoil-section blade design provides *high-volume* air flow at maximum efficiency. Sizes to 60 inches in diameter. Capacities to 85,000 c.f.m.

Propellairs give you positive, *controlled* ventilation—air volume and velocity *predetermined* to suit your needs—day and night circulation *independent* of outside weather conditions. They make *your* plant a *good place to work.* Less labor turnover, higher employee efficiency, *lower production costs* are *immediate* benefits.

FOR ALL EXHAUST AND FORCED AIR PURPOSES

Propellairs serve *all air-moving needs.* Used in roofs, walls, windows, ducts, hoods, stacks, and with pedestals and stands. For ventilating large or small areas and "hard to reach" corners—for directing air blasts at hot castings and shake-outs—for improving working conditions *throughout the plant.* Propellairs make all work easier—help boost output.

Standard of the Industry

A large percentage of new, modernized, and long established foundries are ventilated by Propellair Fans. Call in a Propellair *specialist* to analyze *your* needs and suggest improvements. No obligation. For prompt action, *write today.*

PROPELLAIR
DIVISION OF ROBBINS & MYERS • INC.
SPRINGFIELD • OHIO

(*Continued from page* 210)

cost control, is "get joint participation in setting up standards and budgets between top management, the cost department and the man who will operate under it." Unless the supervisors share in the work of setting goals and standards and are satisfield that they are fair *before* they are started, they will not be sympathetic with the requirements and will fight them instead of fighting to get them.

The cost department, through its reports, can make a vital contribution to the teamwork on cost control by demonstrating that it can help other departments do a better job. The cost department must submit accurate, easy-to-use cost reports, and be willing at all times to explain the figures or to prepare any additional figures that are required for an operating problem.

Need Further Knowledge

During my past experience, I have found that the main problem of getting teamwork from all those necessary to make cost control work lies in part in lack of knowledge about the cost system and cost control, its use and its importance; and in part in top management's failure to insist that attention must be given to cost.

Do not expect to get teamwork between the cost department and the operating personnel until such time as they talk the same language. A foreman will balk at paper work involved in compiling costs and will be very slow to use cost reports as a guide unless he fully understands why it is done and what it can do to help him.

Cost control is not a matter for managers and controllers alone. It must go into all divisions of the company and right down the line. Production, sales, purchasing, personnel, research, etc., can all contribute to make the cost system work and can all profit materially from its use.

Unless a goal is set in advance each month for each production center in the form of a production and expense budget, it becomes rather difficult for a foreman to know what is expected of him; and, further, attention is not directed ahead of time to the sales and other departments to the fact that certain production centers have too much work and others too little work ahead for the coming month. Production center budgets, if practical, should always be made at least ten days prior to the beginning

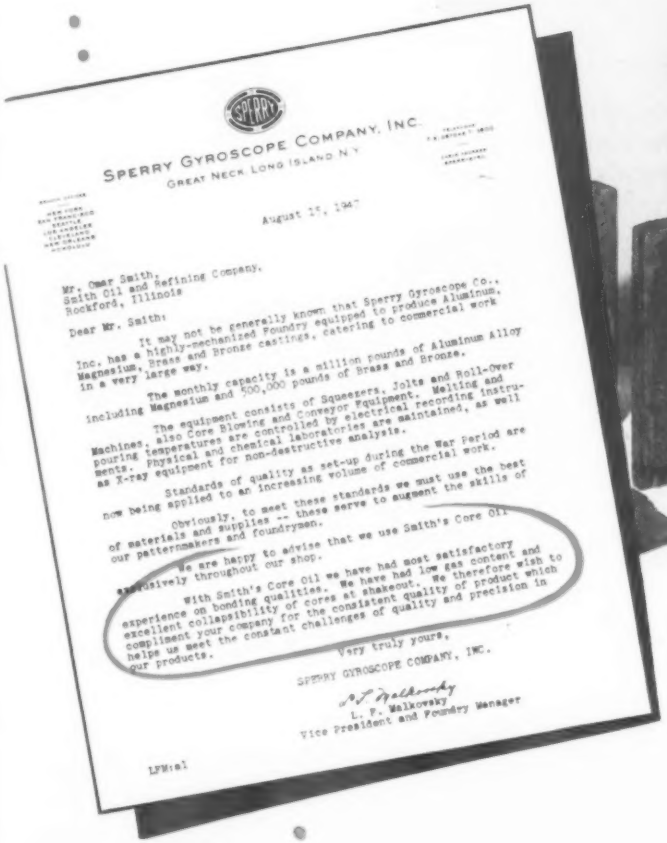
(*Concluded on page* 214)

MOLDED TO

PERFECTION

Sperry Gyroscope Co., Inc. meets the constant challenge of Quality and Precision in its Products with the help of

Smith L-O Core Oil



SPERRY GYROSCOPE COMPANY, INC.
GREAT NECK, LONG ISLAND, N.Y.

August 25, 1947

Mr. Omar Smith,
Smith Oil and Refining Company,
Rockford, Illinois

Dear Mr. Smith:

It may not be generally known that Sperry Gyroscope Co., Inc. has a highly-mechanized Foundry equipped to produce Aluminum, Magnesium, Brass and Bronze castings, catering to commercial work in a very large way.

The monthly capacity is a million pounds of Aluminum Alloy including Magnesium and 500,000 pounds of Brass and Bronze.

The equipment consists of Squeezers, Jolts and Roll-Over Machines, also Core Blowing and Conveyor Equipment. Melting and pouring temperatures are controlled by electrical recording instruments. Physical and chemical laboratories are maintained, as well as X-ray equipment for non-destructive analysis.

Standards of quality as set-up during the War Period are now being applied to an increasing volume of commercial work.

Obviously, to meet these standards we must use the best of materials and supplies -- these serve to augment the skills of our patternmakers and foundrymen.

We are happy to advise that we use Smith's Core Oil exclusively throughout our shop.

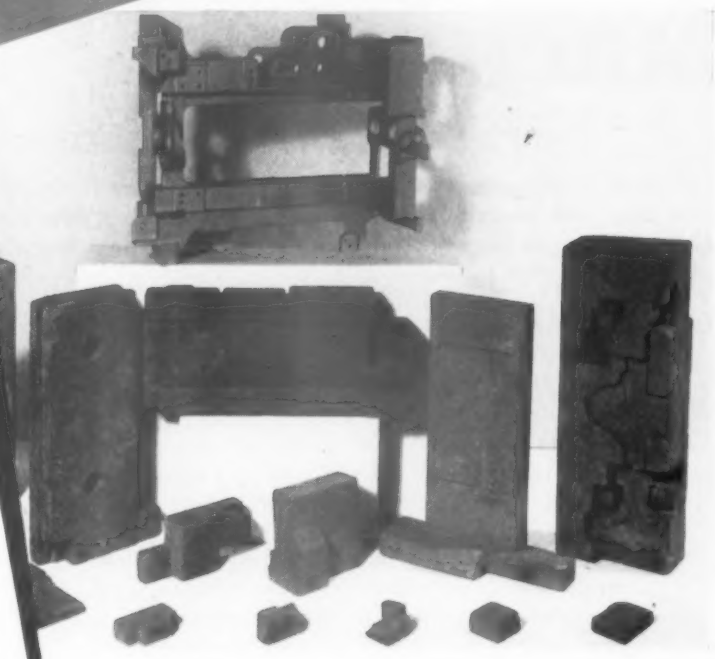
With Smith's Core Oil we have had most satisfactory experience on bonding qualities. We have had low gas content and excellent collapsibility of cores at shakeout. We therefore wish to compliment your company for the consistent quality of product which helps us meet the constant challenges of quality and precision in our products.

Very truly yours,

SPERRY GYROSCOPE COMPANY, INC.

L. F. Walkowsky
Vice President and Foundry Manager

LFWsal



Read the letter at your left. See for yourself what Sperry Gyroscope Co., Inc., has to say about Smith L-O Core Oil. This uniform, high quality oil — the only core oil processed by the Dow-Therm method of heat control — is used *exclusively* in the Sperry foundry. It has proved its superiority in the makeup of such intricate cores as those illustrated above . . . has helped immeasurably in producing highly-specialized jobs . . . You, too, will endorse Smith L-O Core Oil once you try it. Write today for the name and location of the Smith distributor nearest you.

INDUSTRIAL OILS DIVISION

CORE WASH • ROD DIP • LIQUID PARTING

SMITH OIL & REFINING CO., ROCKFORD, ILLINOIS

Announcing:

The MILLER-WELLMAN CORE BOX MACHINE

The First UNIVERSAL *Power Driven* CORE BOX MACHINE!

"THE INTERNAL LATHE"

The Wellman Products Company takes pleasure in announcing the first practical power-operated portable Core Box Machine, capable of handling all types of circular core box work. Here are a few of the things this machine will do:

1. **Roughs out and finishes cylindrical, spherical and elbow cuts in core boxes in a fraction of the time required with hand tools, also operates over match plates or follow boards.**
2. **Will do internally everything the lathe will do on external work with safety, ease, accuracy and often greater speed. Also makes external cuts up to one-half cylinders or spheres.**
3. **Will make duplicates of core boxes by using identical settings and produces ribs, flutes, recesses, pads, bosses, etc., complete with fillets and draft regardless of grain direction and without any sawing, kerfing or hand gouging.**

Here is a machine that can easily pay for itself on its first job.

Write for further information and prices!

The **WELLMAN PRODUCTS** *Company*

PATTERN SHOP SUPPLIES TOOLS and EQUIPMENT

1447 East 49th Street CLEVELAND 3, OHIO

(*Concluded from page* 212)

of the month covered thereby.

Production center monthly budgets, when prepared in advance, put the spotlight on the sales department and directs its attention to the need for certain work in order to maintain efficient operation of all the production centers during the coming periods.

May I suggest in the interest of making reasonable profits, month to month, that consideration be given by each member of the steel casting industry to setting up monthly budgets, by production centers, establishing cost centers, and determining casting cost by individual patterns before setting selling price thereof.

The steel casting industry should have no fear of surviving the future if it puts cost control back to work.

Factory Planning and Layout

Policyholders Service Bureau, Metropolitan Life Insurance Co., New York 10, has published a report, "Factory Planning and Layout," to assist executives in planning towards best possible results in operating efficiency and good working conditions. Methods suggested can be used in studying minor re-arrangements within an existing plant in order to improve working conditions, as well as in planning the layout of a new plant to provide operating efficiency and clean and orderly surroundings. Subjects covered by the report include: Factors affecting factory planning and layout together with necessary data therefor; space requirements; allocation of area; building types; location; building facilities required; and moving machinery and equipment. Copies of the 40-page report may be secured upon request of executives who address the Policyholders Service Bureau on their own business stationery.

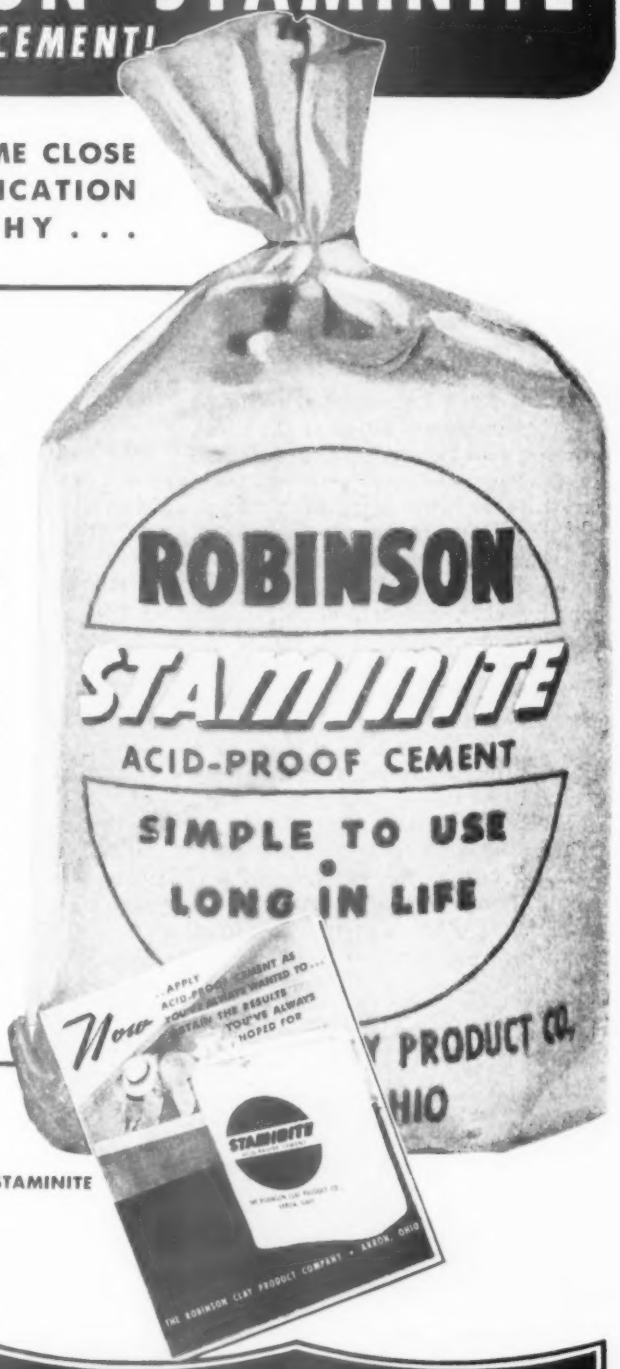
Meehanite Foundries Plan Convention

Meehanite castings manufacturers will hold their annual convention sponsored by the Meehanite Metal Corp. at Hotel Carter, Cleveland, Nov. 6 to 8. Management and production officials of the 42 Meehanite foundries in the United States and Canada and representatives from some of the foreign organizations will attend the meeting. About 50 papers on foundry production, management and sales problems will be presented.

Compare ROBINSON STAMINITE
WITH ANY OTHER ACID-PROOF CEMENT!

NO OTHER ACID-PROOF CEMENT CAN COME CLOSE TO STAMINITE EITHER IN EASE OF APPLICATION OR IN PERFORMANCE. HERE IS WHY . . .

1. **EASY TO MIX** — Robinson Staminite Acid-Proof Cement is factory mixed. Simply add water according to directions and use as any cement mortar. No job failure can result from improper mixing. No bulky drums of solvent to handle.
2. **EASY TO APPLY** — Anyone who has used a trowel can apply Staminite. No difficult masonry technique is needed to get a good job with Staminite. Installation is quick and inexpensive.
3. **WATER-PROOF** — Staminite is water-proof to the point of actually becoming harder under water. This outstanding feature allows pickling tanks or other installations to be flushed with water without damage to the cement.
4. **ACID-PROOF** — Resistant to oils, solvents, neutral salts. Proof against all acids, hot or cold, except hydrofluoric.
5. **BEST FOR SULPHURIC ACID CONDITIONS** — Low fluorine content of Staminite (only 2% compared with the usual 8%) makes it far superior where sulphuric acid conditions are encountered.
6. **ABRASIVE RESISTANT** — Staminite Acid-Proof Cement is harder . . . more resistant to abrasive action. This feature permits the use of Staminite in many installations not possible with ordinary acid-proof cements.
7. **SETS CHEMICALLY** — Staminite does not depend on acid washes to become acid-proof, or on contact with air to become hard. It sets *chemically* without interfering with brick-laying.
8. **STRONGER . . . LONGER LASTING** — At the end of seven days, Staminite is acid-proof and water-proof, and equal or superior in durability to the best cement mortars.



WRITE FOR FREE FOLDER GIVING COMPLETE TECHNICAL DATA ON STAMINITE

TRY IT IN . . .

STEEL PICKLING TANKS — Staminite masonry surfaces are long-lasting under severest acid conditions . . . can be flushed with water.

IRON CLEANSING TANKS — Used in foundries to clean castings before they are porcelain enameled. Constant flushing of the tanks only makes Staminite harder.

FLUES AND STACKS that carry acid gases from blast furnaces or other installations where corrosive fumes are formed.

BOILER CHIMNEYS — Staminite resists sulphuric acid. It is an especially valuable bonding mortar in chimneys carrying gases from coal of high sulphur content.

THE ROBINSON CLAY PRODUCT CO.
AKRON • OHIO

REFRACTORY PRODUCTS: Standard and Special Shapes in Silica and Fireclay Brick. Ground Fire Clays, High Temperature Bonding Mortars, Castable Refractories, Plastic, Insulating, Ladle Brick.
BUILDING PRODUCTS: Clay Pipe and Fittings, Septic Tanks, Clay Liner Plates, Flue Lining, Clay Stove Pipe, Chimney Tops, Wall Coping, Meter Boxes.

R-347-23

VISUAL ANALYSIS OF SAND GRAIN DISTRIBUTION

(*Concluded from page 84*)

tion. This is a mechanical function and is usually the result of pressure of the metal forcing it into the interstices or voids between sand grains. In a majority of such cases addition of a finer sand would perhaps have eliminated the mechanical metal penetration, but the so-called popular cure of heavy additions of silica flour always has been preferred. Until recently the word "density" was not considered important, but today it is given more attention by progressive foundrymen than in the past.

Fig. 2 depicts a prominent three-screen sand with over 60 per cent retained on the 50-mesh screen with the remainder distributed on the two adjacent screens. Unless considerable bonding clay, seacoal, cereal, wood flour or other raw materials which help to control sand expansion are employed, the high volume changes easily can result in scabs. If the green compression strength of such a sand drops below the standard established, the molders must not ram too hard, since mold hardness is increased which, in turn, increases sand expansion. Too uniform a sand (retained on a few screens) gives as much trouble as one which is nonuniform. A uniform sand, as indicated in the graph, must carry higher green strength than a sand with wider grain distribution.

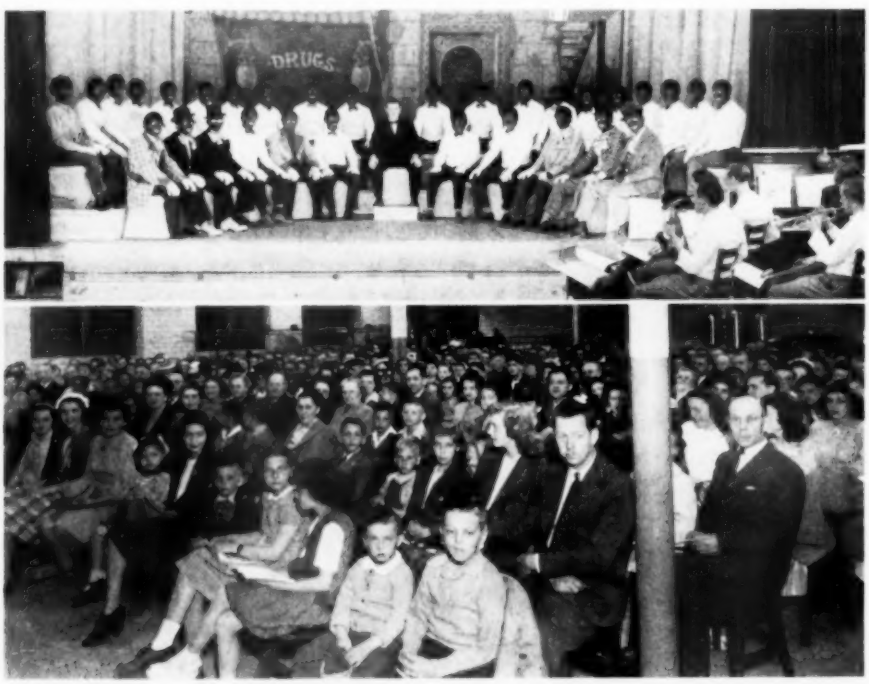
Fig. 3 illustrates a sand which had an AFA Grain Fineness Number of 60 before an "opener" sand was added. Through addition of the latter it was expected that permeability would be increased, but that effect was accomplished only to an extremely small degree as the sand grains did not blend and tended to "elbow" each other out of position.

The sand lacked fines and was brittle, had poor resilience and toughness. Volume changes were great at thermal operating conditions, and considerable clay bond had to be added. Cereal and wood flour additions helped to eliminate scabs, rattails and buckles. Workability of the sand was poor. Flowability was decreased and much butting and tucking were required to force the sand around pattern contours. The sand cracked badly under heat and that condition could be corrected only by iron oxide additions or higher green compression strength.

Fig. 4 indicates a sand with two peaks—on the 80—100-mesh, and on the 270-mesh sieves. The excess fines on the 270-mesh sieve and pan increased the surface factor, which resulted in greater bulking effect and "soaked up" water. Increased water encouraged unpredictable sand expansion. The sand at the two peaks did not blend well and the castings showed fissures, fins or veins. Permeability was decreased and if the sand was rammed too hard, blows occurred. If rammed too soft, veins or "mapping" appeared. Preponderance of fines caused the sand to "ram-off" and the molders called the sand "rotten." It was difficult to "open" such a sand since, to use an old foundry expression, "You cannot raise the permeability of a bag of silica flour by mixing it with a bag of marbles." Without proper grain distribution little can be done with such a sand. Only by reducing the quantity of 270-mesh and pan material, can the sand be restored in balance.

Sand Is Satisfactory

Fig. 5 shows a sand which supplied the best overall working conditions. It has a wide grain distribution and is bonded easily. Moisture retention is good and flowability is improved by the wider range of distribution. Density is increased, but sand expansion is less than a three-adjacent screen sand. Wide distribution of sand grains permits the smaller grains to fill the interstices between the larger ones, resulting in a "knitting" action, and the voids are well distributed. Less bond is required with such a sand as the knitting action of the grains supplies some compression strength. The sand holds its position properly when rammed, and dimensional accuracy of the resulting casting is always within desired tolerances because maximum mold hardness can be maintained more easily. In the case of a core sand with such distribution, slightly more core oil is required than in the case of a three-screen sand due to increased surface factor, but not appreciably more. Any fines such as seacoal blends into the sand without disturbance. Wider sand grain distribution is being encouraged by many foundries by blending two sands—one fine and the other coarse.



GLEE CLUB of Belle City Malleable Iron Co., Racine, Wis., recently presented a minstrel show in the company cafeteria for employees and their families. Part of the audience is shown in the lower view

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All things are easy when you have the right tools and making molds is no exception.

Get the highest possible production out of your molders and make it easy for them at the same time by installing Herman Molding Equipment . . . improve employee morale and increase your profits through accelerated production of *uniformly perfect molds.*

Herman Molding Machines employ fast, sure, powerful, steady hydraulic power and only Herman Molding Machines give the patented roll-over action that provides a complete 180° roll-over with power applied on only 90° of the roll.

Learn how hundreds of foundries have made tremendous strides in the science of improved *uniformly perfect* mold production with the aid of the latest Herman Molding Machines, and improved molding department layout. Get all the facts. Invite an experienced Herman foundry engineer to give you all the details.

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

BELGIAN FOUNDRIES

(*Continued from page* 93)

power. The nation may be approaching a turning of the road where difficulties, still unseen by many, will have to be faced. Probably imports of consumer goods will have to be cut down to make place for larger imports of capital goods, plant and machinery. But the people of Belgium are hard working and there are incentives to work which are not so prevalent in other countries, so most Belgians are inclined to look into the future with a degree of optimism.

An opportunity to visit two or three typical Belgian foundries has brought confirmation of the fact that the tradition of good workmanship has been kept. It is also worthy of note that the Belgian foundry industry is blessed with a plentiful supply of good foundry sand extracted from a number of quarries in the vicinity of the principal foundry centers.

The Fonderies Nestor Martin, near Brussels, have a reputation of long standing for the manufacture of cookers, heated by coal, gas or electricity. The buildings are of modern construction, and the shops are light and airy, and well lighted. The foundry is at present partly mechanized and plans are prepared to modernize it by installing new plant and equipment. It is also planned to re-equip the enameling plant on modern lines. The melting plant consists of four 8-ton cupolas with automatic control of the air flow. Production of castings runs from 650 to 700 tons per month. Molds are filled and rammed on various types of molding machines, some hydraulic; the molds are then placed on continuous conveyors and after the metal has been poured, the molds continue their travel beneath floor level, where they are partly cooled, and they are shaken out at the farther end of the conveyor line. Sand is carried from the sand preparing plant on trucks.

Molds Made on Machines

Certain castings are molded at two roundabout stations. The flasks are 2.5 x 1.5 feet; pattern plates are used, and the sand is supplied through hoppers. Four men work at each station. These roundabouts were installed in 1929. At the time of the visit they were producing about 100 molds per hour, but their actual capacity is greater. Recently a core blowing machine has been installed in this foundry.

The Fonderie Moons, at Zelem, between Brussels and Liege, is a typical case of a family business which has been prospering for over 100 years. The present senior partner and managing director, Senator Rameakers, manages the business with his son and the co-operation of his two daughters, one of whom acts as his secretary for his senatorial duties. The foundry specializes in the manufacture of large window frames for factories and other buildings, and also municipal castings. Formerly this foundry was renowned for the making of art castings for gates, balconies, and other ornamental purposes. The foundry is situated in the countryside and in the same grounds as the residence of the owners. This house is of old style and the windows are decorated with fine examples of balconies cast in the foundry.

The entrance hall of the foundry and the managerial office also contain many examples of artistic work previously done in the foundry, and a notable feature is an oversize cast iron bust of the king of the Belgians, an outstanding example of skilled and unusual work. About 100 men are employed in this foundry many of

(*Continued on page* 220)

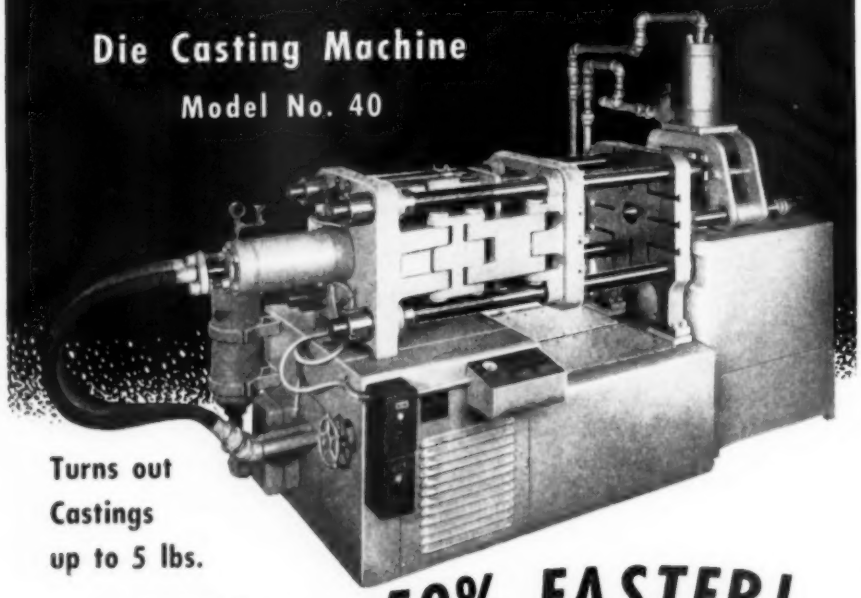
...Introducing

A REVOLUTIONARY NEW

"CAST-MASTER"

Die Casting Machine

Model No. 40



Turns out Castings up to 5 lbs.

...10% to 50% FASTER!

A "natural" for shops doing small or medium castings or shops needing a supplementary machine to handle smaller dies

Catalog and Specification Sheet available on request

A die-casting machine, designed by leading die-casting engineers, to produce light and medium castings at a rate of speed and efficiency heretofore considered impossible. Precision-built, it offers the same rigidity, the same superior construction as other famous Cast-master models . . . plus added exclusive features that speed up production and cut operating costs to a NEW LOW.

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FABREEKA

UNDER SHAKEOUT MACHINES JOLT MOULDERS AND OTHER HEAVY MACHINERY

FABREEKA has demonstrated its ability to increase production efficiency and reduce the costs of maintenance by absorbing the effects of heavy impact shock and destructive vibration under such heavy machinery as shakeout machines, jolt moulders, forging hammers, grinders, stamping machines and many others.

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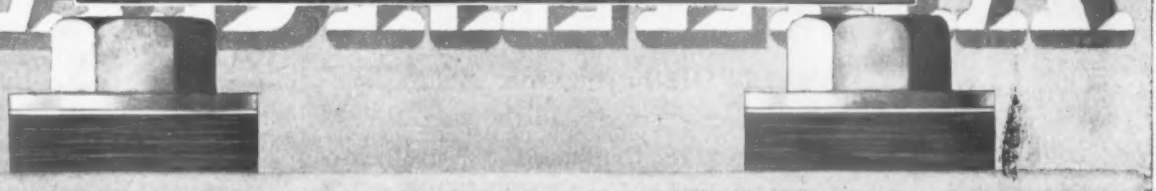

for IMPACT SHOCK and VIBRATION

(*Continued from page* 218)

whom have spent their working lives there, succeeding their fathers. The larger flasks used for peparing the molds for window frames are 12 x 15 feet divided into 120 rectangles. The molds are rammed mainly by hand. For the time being, when the molds have been filled they are lifted and turned over by means of chain and pulley tackle, but they will eventually be handled by an electric crane. All the patterns are made at the works.

The sand comes from the quarries of Nimy les Mons, and strict control of the molding sand is carried out. Semiphosphorus iron is used and the output ranges from 6 to 7 tons per day from a recently installed cupola. There is a second cupola which is to be replaced by a new one. The window frames, after they have been cast, are assembled at the works. At the time of the visit a new bay had been erected, in which a 10-ton electric crane will be used to handle the heavy molds.

The visit was made by a group of some 40 members of the London branch of the Institute of British Foundrymen, and at the end of the inspection a typical welcome was extended to the visitors who were assembled in the new bay as yet devoid of machinery. The walls were decked with flags and all the workmen of the foundry were assembled to receive the visitors. The managing director and his brother, the local vicar, toasted the visitors and then addressed the worker; wine was served all around, and the young apprentices were not forgotten.

One left with the impression that the concern was traditionally run as a family business, the workers themselves being part of the family, and the general atmosphere of mutual loyalty was unmistakable. Incidentally, at harvest time, the workers are allowed time off to work in the fields. This was a refreshing example of the benefits arising out of a well conducted private enterprise. And, be it said that, while the present operation of the foundry may be on old fashioned lines, the plans for modernizing the works are going ahead.

Loam Molding Practiced

Another example of a typical family business is that of Fonderies Foulon in Liege itself. This is a jobbing foundry, making mainly engineering castings ranging from 150 pounds in weight up to 15 tons. Most of the work is done by loam molding, and here again the native skill of the molders was apparent. Two cupolas are in operation and the output is about 150 tons per month. The feature of this foundry is that it is privately owned and was started by the grandfather of the present owner, Lucien Foulon, who is treasurer of the Belgian foundry technical association.

The foundry is situated on a busy street of Liege. Originally it comprised one bay. The successor of the original owner acquired some the nearby buildings and added a second bay. Then the present owner himself acquired a further block and has built a third bay. The next step will be to substitute a new and modern mechanical plant for the old. It is a remarkable fact that all the past, present and future developments will have been made by the successive owners from their own resources and without outside help, official or otherwise. Here again one noted the friendly relations between the owner, his staff and the workers, and the resulting excellence of the work.

Mention should also be made of the

(*Concluded on page* 222)

THE LAST DROP IS AS GOOD AS THE FIRST

ASK THE MEN WHO USE IT!

DAYTON OIL in your core room means perfect cores every day in the year. As in the past 23 years, the same 100% uniformity and quality of DAYTON CORE OIL are being maintained. This is our guarantee. Write today for complete information.

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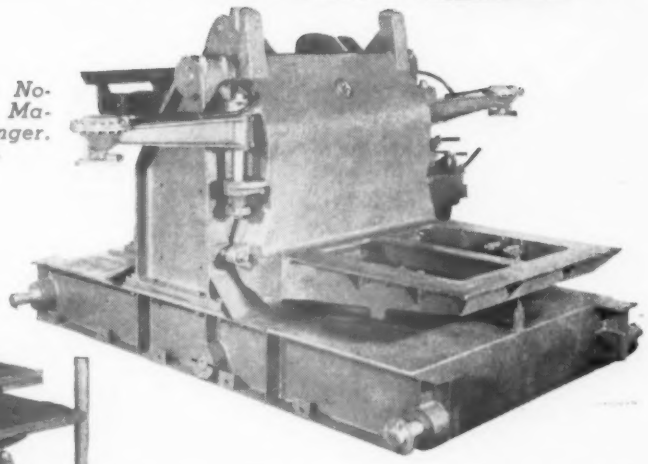
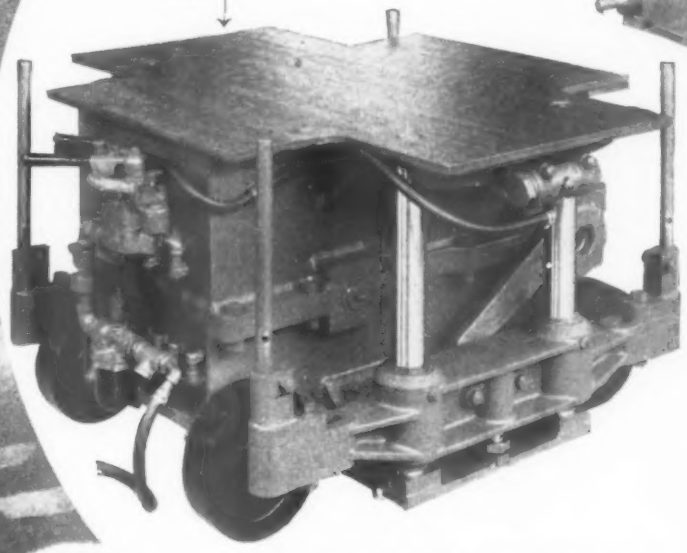
SPO MOLDING MACHINES

Special portable SPO No. 2340 Rockover Draw Machine for large, slinger. rammed molds. ⟶



SPO No. 012 Plain Stripper Molding Machine for cope molds—a companion to No. 2340. ⟶



Do you need equipment to handle slinger-rammed molds? *SPO has the answer*—and it's on this page. The two SPOs shown above pair up perfectly. Using them for drag and cope molds, you eliminate slow, awkward, in-between handling or drawing operations. Ram, clamp, roll over and draw the drags on the No. 2340 Machine. Ram and strip the copes on the No. 012. Together, they enable you to obtain maximum production and accuracy by the slinger method of molding. *Here is SPO versatility at its best.*

MEMBER

We shall be glad to send you a bulletin describing these machines.

SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO

(*Concluded from page* 220)

renowned works of Esperance-Longdoz and Cockerill in the vicinity of Liege. The foundries of Esperance-Landoz turn out rolls of various sizes which have earned the company a well deserved reputation; they also make a variety of engineering castings, mainly on the heavy side. Loam molding in this foundry has reached the level of a fine art. Much of the success of this company is due to the veteran foundry manager, J. Varlet, an honorary member of the Institute of British Foundrymen, who, at the age of 75, still goes to the foundry practically every day.

Cockerill is well known for the variety of engineering castings of all kinds that it makes. Some of the most notable products are marine and stationary diesel engines, gas engines, chemical plant, large machine tools, etc. Considerable superficial damage was done to the works toward the end of the war; no less than 40,000 square meters of windows were shattered. Operations were resumed about 18 months ago by regrouping the bays that were the least damaged, and already the present output is 1600 tons of finished iron castings per month and 400 tons of steel castings. About 650 men are employed in the iron and steel foundries.

During a rapid visit one noted the first cast Meehanite crankshaft for a diesel engine, weighing one and a half tons, and made in the foundry. Several diesel engines were being assembled, two of which are to be installed on a new cross channel steamer now being built at the Cockerill yards at Hoboken (Belgium). A feature of the machine shop is a horizontal lathe, one of the largest in Europe, which can turn colliery winding wheels up to 10 metres in diameter; this lathe was designed and made at the Cockerill works.

This short description of things that were seen in the course of a rapid visit can give some idea of the work of reconstruction already done in Belgium since its liberation. The impression retained is that the Belgian people are exerting themselves to rebuild their economy and recover their prewar standard of living. In many cases the 48-hour work week is still in operation. Obviously much of the plant and equipment seen requires to be modernized, but the Belgian founders are not lagging behind in technical knowledge and practice, and in this field they are well served by the activities of their own technical association. As to the modernization of plant and buildings, many plans are in hand, some of which provide for the purchase and installation of the latest types of American equipment.

An idea of the degree of revival achieved by the Belgian foundry industry since the liberation can be obtained from the following data:

	1946	1938
Number of cast iron foundries.	345	322
Number of steel foundries	32	33
Number of malleable foundries.	13	14
Average monthly output of iron castings (metr. tons)	20,000	25,000
Average monthly output of steel castings (metr. tons)	3 to 4,000	6,600
Number of employees in iron foundries, approx.	13,000	13,000
Number of employees in steel foundries, approx.	5,250	4,000
Average monthly exports of steel castings (metr. tons)	800	?

New Film Available

A new motion picture, "Watts in Glass," has been produced for the Owens-Corning Fiberglas Corp., Toledo, O., and is available for showing by technical and industrial organizations and other groups. The 25-minute sound film describes the use of glass fiber insulation in electrical equipment.

THE AJAX-Tama-Wyatt Low Frequency Induction Furnaces are now made in small sizes with capacities ranging from 20 to 35 kw.

Their operation is based on the induction principle whereby energy is transmitted to the molten charge without actual contact, through the refractory walls. Only the metal is heated, and therefore, there are no resistors or other parts having a higher temperature than is absolutely necessary for properly melting the charge. A gentle movement of the bath insures uniform temperature and homogeneous mixing of the alloy ingredients. Linings are made of inert refractories which do not contaminate the melt.

These melting machines are delivered with a self-contained completely factory wired control cubicle, including automatic temperature controller.

AJAX ENGINEERING CORPORATION, Trenton 7, N. J.

AJAX INDUCTION MELTING FURNACE

TAMA-WYATT

Associate Companies

AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

PERMANENT MOLD CASTING ALUMINUM

(*Continued from page* 89)

pointed out that in both fan and finger gating systems, the hot metal begins to fill the casting cavity from the bottom, and as the cavity fills the point of entry of hot metal moves upward in the same degree. Hence, the hottest metal is at the highest point where it is desired to feed the casting during the solidification process. Other practices sometimes employed include a gooseneck in the sprue or a sump or enlargement of the bottom of the sprue. The first, by complete reversal of the direction of flow in addition to a slight restriction in cross-sectional areas, reduces the rate of flow, while the sump acts similarly since the enlarged section takes a longer time to fill.

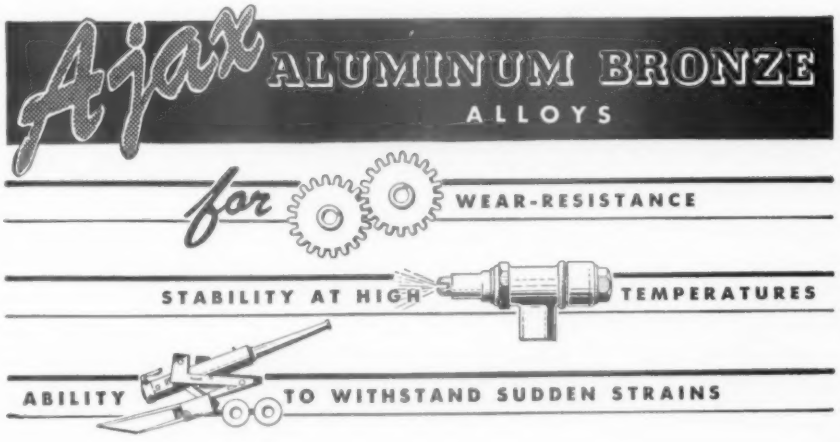
Regulate Mold Thickness

While the usual rule-of-thumb method for determining the thickness of the mold is three to four times that of the casting, it is noted more for exceptions than applications. First, for reasons of strength, rigidity or stiffness, the mold thickness seldom is less than 5/8-in. Second, the molds are opened and closed either through hinge arrangement or by sliding along tracks or guide rails. The molds require attachment of hinges, lugs, brackets, etc. for operating mechanisms, and as a consequence the mold contour seldom follows that of the casting.

Molds usually are made of gray cast iron which must possess a dense, uniform structure in addition to heat resisting properties. Since gray cast iron is impermeable, means must be incorporated to permit venting of air and gases to the mold exterior. This is accomplished by filing or tooling small passages or grooves across the parting surfaces of the mold. The grooves are 0.02 to 0.03-in. deep, extending from the mold face to the edge, and are sufficiently large to permit the escape of gases, but small enough to prevent the entry of molten metal. In some cases where venting is required and parting or joint lines are not available, the procedure is to drill a hole through the mold, and insert a plug containing vent grooves around the periphery. In cases where sand cores are employed to provide cavities in the casting, considerably larger vents must be employed to insure removal of the core gases.

An important feature in permanent mold practice is the use and application of mold coatings which serve three purposes. One is the prevention of molten metal cutting or eroding the mold surface. Another is to eliminate adherence of the casting to the mold, and the third is to control the cooling rate. A variety of mold coatings are available, and they incorporate a refractory material such as French chalk, china clay, whiting, talc, asbestos, mica, fireclay alone or in combination. The material is suspended in water with the addition of a small amount of sodium silicate, and sometimes small quantities of rouge or graphite are added for general lubrication purposes.

Mold coating should be of thin consistency, and preferably applied with a spray gun. Procedure is to heat the mold to around 400° F., and apply a number of thin coats of the material rather than one or two thicker ones. At the gates and risers, and in other areas where it is desired to hold the cooling rate to a minimum, the coating is built up by applying successive layers until sufficient thickness is obtained. At points where the highest cooling rate is wanted, only one or two coats

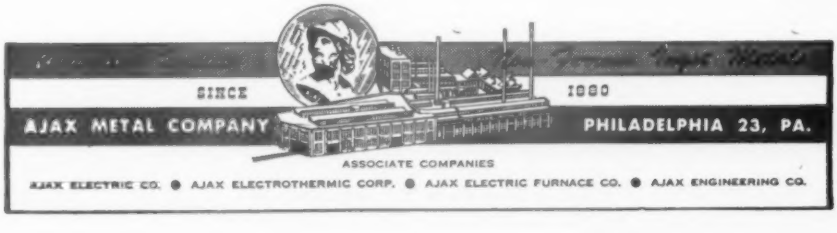


Investigation of Aluminum Bronze Alloys is warranted by foundrymen and designers where metal parts are subjected to either recurrent stresses or compressive forces and resistance to fatigue is sought; where the ability to withstand high temperatures or, where a high degree of corrosion resistance to many chemicals may be a significant factor in material selection. Supplied by Ajax in alloyed compositions of copper, aluminum and iron, as well as special alloys containing nickel and manganese, a complete selection of Aluminum Bronzes is available to meet all existing specifications as listed by Non-Ferrous Ingot Metals Institute, ASTM and the Federal Government.

Ajax, in adhering to its policy pioneered in the very infancy of the non-ferrous metal industry, exercises the closest scientific control over the production of these alloys. Metal men may look to Ajax with continued confidence not only for supply of highest quality Aluminum Alloy ingots, but also for practical technical know-how on correct foundry practice for producing better castings with fewer rejects. Request booklet "Ingot Metals of Today".

Standard Ajax Metals

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin


SINCE
1900
AJAX METAL COMPANY
PHILADELPHIA 23, PA.
ASSOCIATE COMPANIES
AJAX ELECTRIC CO. ● AJAX ELECTROTHERMIC CORP. ● AJAX ELECTRIC FURNACE CO. ● AJAX ENGINEERING CO.

are applied. Thus, it may be seen that the cooling rate can be varied to a considerable degree by the thickness of the mold coating. To insure smooth casting surfaces, the mold coating is dressed down or polished with fine steel wool. After the mold is placed in operation, and it is found that the coating is too thick in certain areas, it may be reduced by rubbing with steel wool. If the coating is too thin, it can be built up by spraying on the desired amount.

The foregoing discussion does not cover all the features relating to production of permanent mold castings, but does indicate that experience fills an important role, and that from initial proposal to finished casting production proceeds along fairly well defined lines. A more concrete conception of those points can be illustrated by describing some of the practices employed by Aluminum Industries Inc. at Cincinnati, where, in addition to one of the most modern permanent mold foundries the company also operates a sand casting foundry.

First step when the firm receives a proposal for a part to be made by the permanent mold casting process, either as the part itself or an engineering drawing, is to submit it to the engineering department. There it is studied, and any recommended changes in design, which will make it more suitable for economical production by the process, are suggested. These changes are submitted to the prospective customer. With his acceptance the job then goes back to the engineering department, where the decision is made on how it will be molded—that is, the establishment of parting lines with number of mold sections, and mechanism of operation method of coring if required, location and number of vents, gating system, and mold operating temperature of the alloy to be used.

Make Wood Patterns

From those data engineering drawings are made and sent to the pattern department which the company operates, and the required wood patterns are made. At this point it should be mentioned that the pattern contains only the impression for the casting cavity. The gating system is tooled out in the machine shop when the mold castings are returned from the outside gray iron foundry for the various machining operations required to bring the casting cavity to the correct size, on the parting faces, etc. All machining operations are performed in the firm's well equipped machine shop.

After the machining is completed the mold is assembled in the shop, and its operation checked to see that it functions properly. The mold then is sent to the foundry for a pilot or test run. During the tests any required changes in gating and risering are made. These consist only of slight increases in size since they cannot be made smaller. Observations are made on proper coating thickness on various areas, best mold operating temperature, proper pouring temperature, correct operating cycle, etc., all of which are incorporated as standard operating procedure when the mold is placed on the production line. For convenience of the operators in observing the correct time for solidification of the metal in the mold, large dial clocks with second hands are located on the walls at both ends of the mold lines.

As may be observed in several of the accompanying illustrations, the permanent mold foundry of Aluminum Industries Inc. is well provided with natural illumination and ventilation by means of the glazed steel

(*Continued on page* 226)

They RESIST WARPAGE

. . . it's less than 0.1%

Transite Core Plates offer all these advantages:

They speed production

Core makers save trips... handle many plates at one time.

They last longer

Made of fibrous asbestos and cement, Transite Core Plates resist shock...are less likely to crack or break.

They clean easily

Core wash, sand, etc., do not stick as readily as to other materials. Both sides are usable.

They resist corrosion and warpage

Transite Core Plate surfaces stay smooth even after long service. Warpage is less than 0.1%.

They are economical

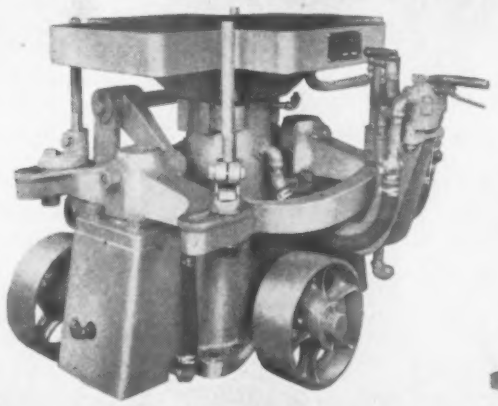
Low price, low maintenance and long life add up to low cost.

To eliminate green cores and reduce baking time perforated plates are also available.

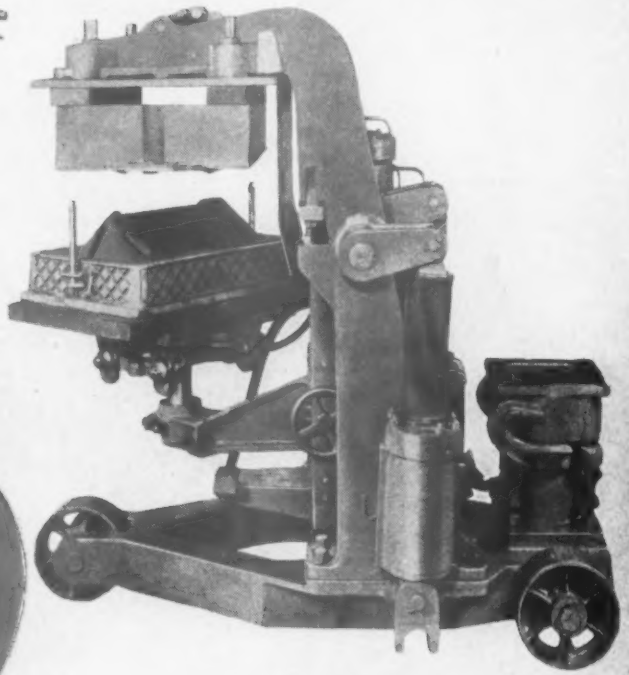
For full details write Johns-Manville, Box 290 New York 16, N. Y.

Johns-Manville

TRANSITE CORE PLATES MADE OF ASBESTOS



No. 681-C
Portable Jolt Stripper



No. 612 Portable
Jolt Roll-Over Pattern Draw

Pace Setters

● Speed up your production and keep competitive with Johnston & Jennings molding machines. The No. 681-C jolt stripper pictured above—furnished portable or stationary—features a valve-less, shock-less, jolt free from rebound, a positive draw, speed of which is variable to meet different conditions,—and complete enclosure of all working parts, thus assuring years of efficient trouble-free service.

The No. 612 Portable Jolt Roll-Over is designed specially for work requiring absolute accuracy in ramming and drawing. It is ideally used for making the intricate cores and molds required in aircraft and other precision industries. Use of two roll-over cylinders and oil dash pot control assures smooth uniform operation. "J & J" has just the machine you need.

Write or phone about immediate deliveries on these and other types of J & J machines

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

THE J & J JOHNSTON JENNINGS CO.

867 Addison Road • Cleveland 14, Ohio

IMPROVED UP-TO-THE-MINUTE MOLDING MACHINES FOR EVERY NEED

(*Continued from page 224*)
sash in the building walls and in the sides of the cupola along the roof. Additional ventilation is provided by cool air blown through 2-ft-square grating in the floor at each molding station. The grating is located where the operator stands when pouring the mold, and the stream of air flows upward around his body, cooling and protecting him from the heat. The various gratings are connected to a duct system under the floor and, in turn, to a blower which supplies the necessary volume and pressure of air in the general vicinity.

Molding stations are arranged in two rows of three lines each on both sides of a wide central gangway as shown in Fig. 5. Each molding station consists of a mold, a bench with a water tank at one end, and a grid-top table. The bench holds the various tools the operator might require, such as tongs for handling castings, pinch or pick-off bars and mallet for removing loose pieces from the castings, etc. The water tank is used for cooling cores or other removable parts. The operator usually places the casting on the bench after removing it from the mold. Here he inspects it for possible defects. Then he puts it on the grid-top table which permits more rapid cooling. After cooling the castings are placed in tote boxes and taken to the cleaning room.

For preparation of the various aluminum alloys used for production of its permanent mold and sand castings, Aluminum Industries Inc. operates a battery of five 20,000-lb capacity remelting furnaces located in a separate building. Here pure aluminum ingot or pig, mixture of pig and scrap aluminum, or all scrap mixtures are remelted, alloyed to bring them to the proper composition, and degasified. Then the molten metal is cast into ingots. Each lot of ingots is identified by stamping a symbol on each ingot. After chemical analysis in the laboratory, the ingots are sent to the foundry melting department or stored for future use.

Furnace Serves Two Stations

Aluminum alloys for the castings are melted in 1000-lb capacity gas-fired crucible and 2000-lb capacity rotary barrel type furnaces located at one end of the permanent mold foundry. Heat and smoke are confined to the melting room by a corrugated steel partition extending to within 10 ft of the floor and a ventilating system. Molten metal is transported in graphite crucibles suspended from an overhead monorail system to 600-lb capacity holding furnaces adjacent to the molding stations. Usually two molding stations are served by one holding furnace. Both melting and holding furnaces are equipped with pyrometers and indicators to indicate the temperature of the metal.

As previously mentioned, pouring temperatures for the various types of castings are standardized after completion of the pilot runs, and to insure that they are followed control of the metal in the holding pots or furnaces is under the jurisdiction of a number of inspectors. These men visit the holding pots at regular intervals, checking the temperatures indicated by the recorders, and make adjustments of the burners when required. They keep the metal surface skimmed, and see that sufficient molten metal is available from the melting department. In addition they inspect the castings for any obvious defects before they are taken to the cleaning department.

In the cleaning room gates and risers are removed from the castings on band saws. Gates and risers

(*Concluded on page 228*)

New Automatic Device Provides Up-to-the-Minute Visual Record

The New Chart-O-Matic

The new CHART-O-MATIC provides an instant visual record of all production, shipments, purchases, absenteeism, etc. Avoids inventory surpluses. Guides purchasing department giving constant picture of all parts and supplies on hand. Requisitions can be made direct from chart. Information from all departments transmitted to operator by Telautograph permits instant recording on CHART-O-MATIC. Does away with big wall charts and card-systems and tedious, time-consuming search for data that is often far from current. With the CHART-O-MATIC, the complete activities of the entire plant can be determined in an instant.

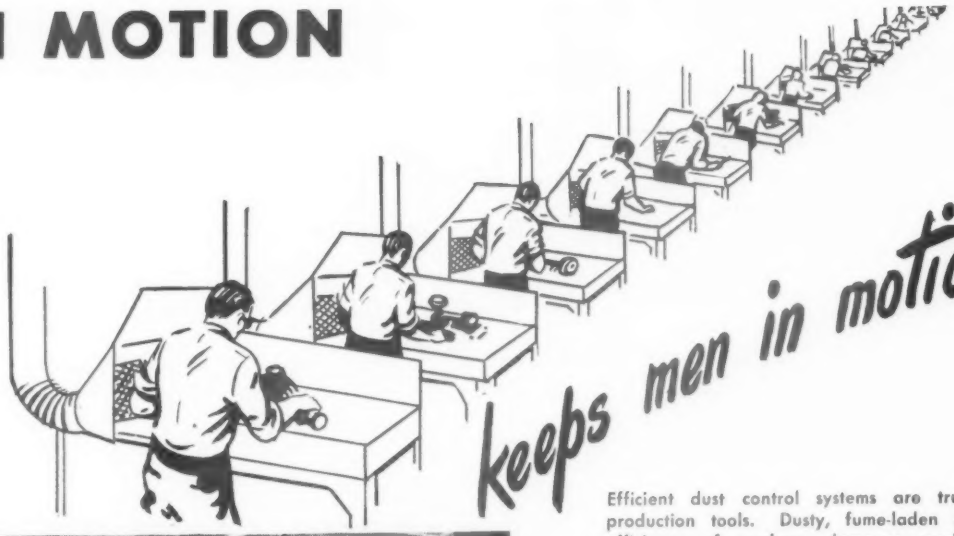
The entire unit is easily portable and operates from 110 volts current. Chart rotates in either direction by finger-tip control. Speed may be governed by rheostat.

New devices are proving their worth in saving time and reducing nervous tension on the job. And modern plants throughout America are finding that chewing gum on the job helps relieve monotony and helps to keep workers alert. That is why more plants every day are making Wrigley's Spearmint Gum available to their employees.

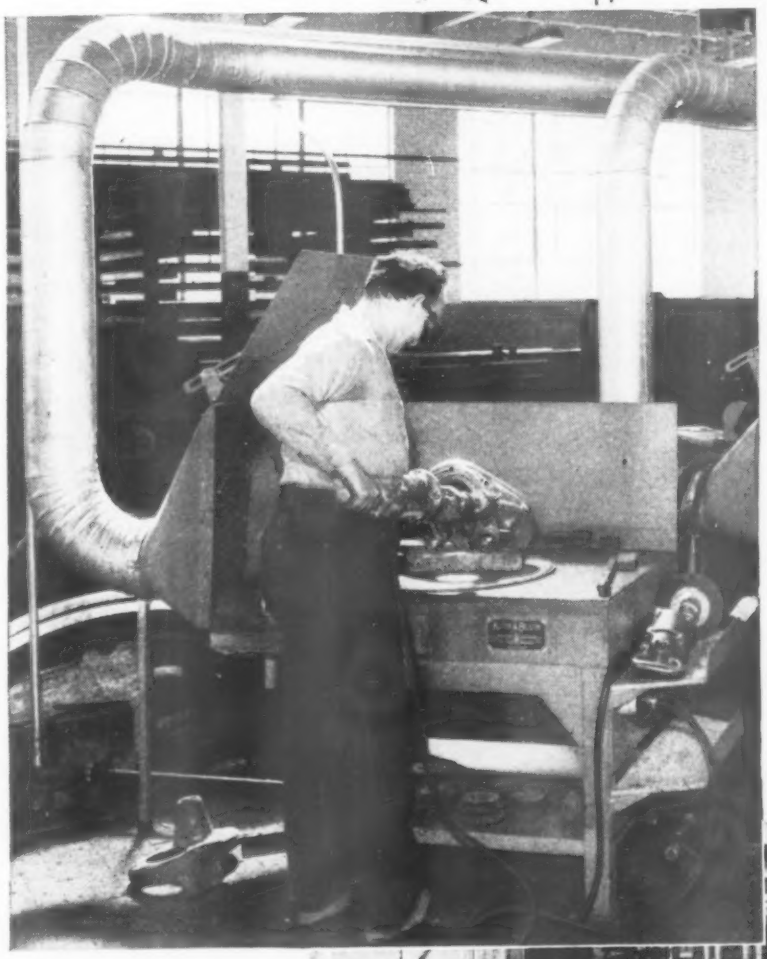
Complete details may be obtained from Spiral Mfg. Corporation, 3612 N. Kilbourn Avenue, Chicago 41, Illinois.

AB-74

AIR IN MOTION



keeps men in motion . . .



Efficient dust control systems are truly important production tools. Dusty, fume-laden air dulls the efficiency of workers, damages machines, motors and bearings, curtails production.

In the plant of a noted chain and forging firm, for example, a KIRK & BLUM installation which replaced an old inefficient system improved working conditions to such an extent that it brought this comment from an official: "Our workmen can now work full time . . . this means added production for them and the company as well."

The illustration at the left shows a KIRK & BLUM system for castings grinding at the bench. Dust, sand and chips are removed as fast as produced. Note particularly turntable in center of bench which revolves work to operator so that he may work continuously. This results in better dust control . . . less lost motion.

Kirk & Blum's forty years of AIR ENGINEERING are at your service. Address: The Kirk & Blum Mfg. Co., 2808 Spring Grove Ave., Cincinnati 25, Ohio.

Complete Catalogs Available:

"Data on Kirk & Blum Production Facilities"
"Dust Collecting Systems in Metal Industries"
"Blower Systems for Woodworking Plants"
"Fan Systems for Various Industries"
"Industrial Ovens"
"Cooling Systems for the Glass Industry"

KIRK AND BLUM
DUST CONTROL

AN ORGANIZATION OF ENGINEERS & MECHANICS

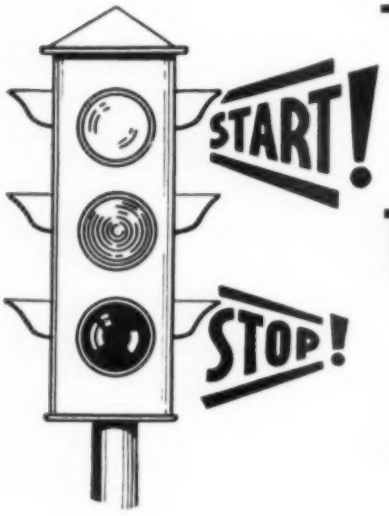
A Kirk & Blum Down Draft Dust Control System in the plant of The Monarch Machine Tool Company, Sidney, Ohio.

(*Concluded from page 226*)

are placed in tote boxes and returned to the remelting department. The castings are placed in separate boxes and transported to two-wheel stand grinders where the slight stubs left from sawing are removed. If the castings require heat treatment, they are forwarded to a department devoted to that work. It is equipped with box-type rectangular and pit type circular furnaces as well as quenching tanks. Heat treatment of castings may involve solution treatment only or solution and precipitation (artificial aging) treatment depending upon composition of the alloy and properties desired.

Since the permanent mold castings must meet definite requirements on chemical composition or on physical properties or on both, close control is maintained from raw materials to finished product. As a part of the control system the company has established a well equipped chemical and physical laboratory. It is located on a mezzanine at one end of the foundry and, in addition to the usual apparatus for conducting wet chemical analyses, is equipped with spectrographic apparatus for rapid, quantitative analyses of certain elements in the casting alloys. The laboratory also contains complete sand testing equipment for control work in connection with the firm's sand casting foundry.

Aluminum Industries Inc. has one of the most modern industrial x-ray laboratories for both fluoroscopic and radiographic inspections. The x-ray equipment is so designed that, when necessary, it can be used for examination of castings on a mass production basis. This equipment permits the metallurgist to detect casting flaws which otherwise might not be revealed. The combination of x-ray examination and other inspection and quality control methods makes it possible to produce castings which not only meet specifications but also possess uniformity.

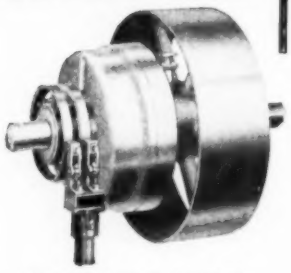


Bring Your POWER TRANSMISSION Problems to Stearns MAGNETIC

For safely, economically and efficiently transmitting stops and starts by accurate near or remote control there is a STEARNS Magnetic Clutch or Clutch and Brake Combination or Magnetic Brake in size or design to adequately take care of your problem.

We are pioneers in the development and application of magnetic friction devices of all types. Our many years of practical experience in the manufacture of magnetic equipment is available to you.

What's your problem? Whether in your plant or product—we invite your inquiry. No obligation. Write for our Bulletin 226 on magnetic clutches or Bulletin 604 on magnetic brakes.



Magnetic clutch on through sha loose pulley application

Magnetic clutch-brake combination

A.C. or D.C. magnetic brakes for motor or machine mounting

STEARNS MAGNETIC MANUFACTURING CO.

662 S. 28th St. Milwaukee 4, Wis.

SEPARATORS—PULLEYS—DRUMS—MAGNETS

CHIPPING OPERATION

(*Continued from page 75*)

as effective as the plate valve hammer. We found this particular type too delicate and too hard to keep in good repair for our use.

TABLE I. COMPARISON OF CHIPPING HAMMERS

Type valve	Plate	Ring	Spool
Overall length	12⅞"	13⅛"	14¼"
Net weight	12½ lb	11⅝ lb	14⅛ lb
Blows per minute	2650	2400	2400
Air consumption, cfm	28	29	26

Air pressures must be given consideration on all hammers. This plant has found all hammers to be most effective with 90 to 100 psi of dry air delivered to the hammer. Dry air is important as moisture has a tendency to lessen the effectiveness of the hammer in operation and also causes excessive wear. After-coolers are definitely recommended between all pneumatic tools and the air compressors. Consumption of air is a factor to which close attention should be given, since compressed air is rather expensive to produce.

Another very important item in pneumatic hammers is repair cost. This is a very controversial subject. Some users prefer to have their tools serviced by the manufacturer through his service departments; others have their own tool repair department and send hammers back to the manufacturer only when complete rebuilding is necessary. Due to this difference in practice of repair, it is hard to make comparative costs. In the experience of the author's plant, it has been found that by maintaining its

(*Continued on page 230*)

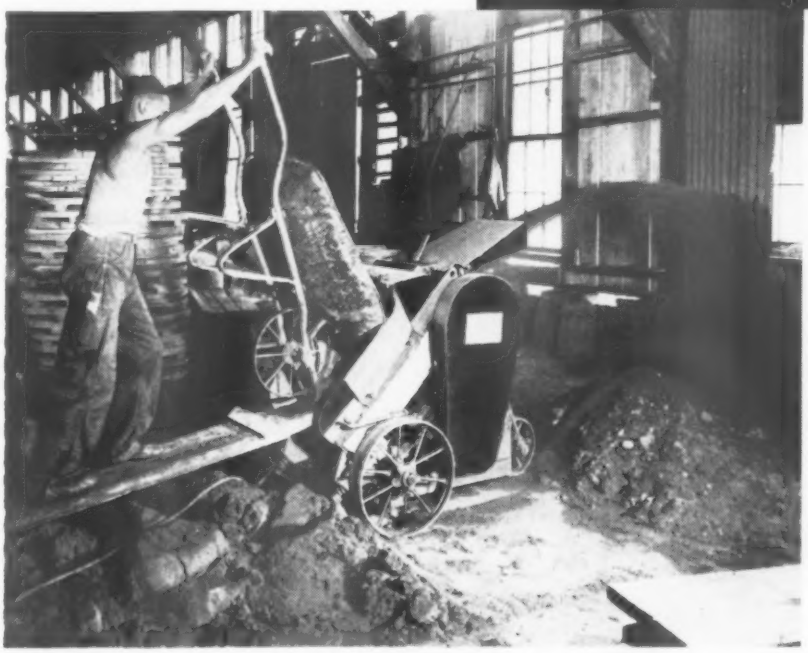
NIGHT AND DAY

WHENEVER YOU PREPARE SAND— THE ROYER DOES IT BETTER....FASTER

Do you condition your foundry sand at night? The Royer Sand Conditioner will cut down the size of the night shift required . . . only one or two shovellers, with a Royer, produce all the next day's requirements for an average foundry.

Do you prepare your sand in the day time? The Royer cuts time spent by moulders and other workers in conditioning sand . . . frees them for productive work.

NIGHT Utica Steam Engine and Boiler Works, Utica, N. Y., do all their sand cutting at night with a Royer Model NC-4; capacity to 15 tons per hour.



DAY The Stiglitz Furnace and Foundry Co., Louisville, Kentucky, prepare sand in the day time with a Royer Model ND-P; capacity 20 to 25 tons per hour.

Men are better satisfied, too—the Royer takes the "gripe" out of a chore. With its patented combing belt, it does all the work: removes refuse, breaks up lumps and clay balls; blends and mixes; distributes moisture evenly; increases permeability; double aerates; and discharges cooled, gas-free, velvety sand. Result: better castings at lower cost. Send for bulletin 744 describing the 10 different models.

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.

KINGSTON, PENNSYLVANIA

(*Continued from page* 228)

own tool repair department, using parts supplied by the manufacturer, the chipping hammers give more economical operation.

Another factor relative to repair cost and life of hammers is oiling. It is required that all hammers in comparatively steady use for eight hours be oiled at least four times per day. Line oilers and the different types of grease that can be used in hammers have been tried. The best results are obtained when the proper grade of oil is supplied manually into the hose connection at the hammer. Selection of the proper grade of oil should be made by carefully following the manufacturer's recommendation. Sufficient oiling is a very cheap procedure. The author would like to stress the proper method of oiling; that is, supplying the oil through the nipple or hose connection of the hammer. Pouring the oil through the air exhaust and into the chisel bushing has been found to be very ineffective.

The bushing in any hammer should be closely watched. It must be maintained to a relatively close dimension if accurate and efficient work is expected from the chipper. The Granite City Works has found the hex bushing to be more satisfactory, since it gives better control to the chipper. The wrist is used in controlling the chisel and hammer and when the bushing becomes worn the chippers immediately complain about increased strain on the wrist. The bushing life is from 8 to 12 weeks depending upon the type of work.

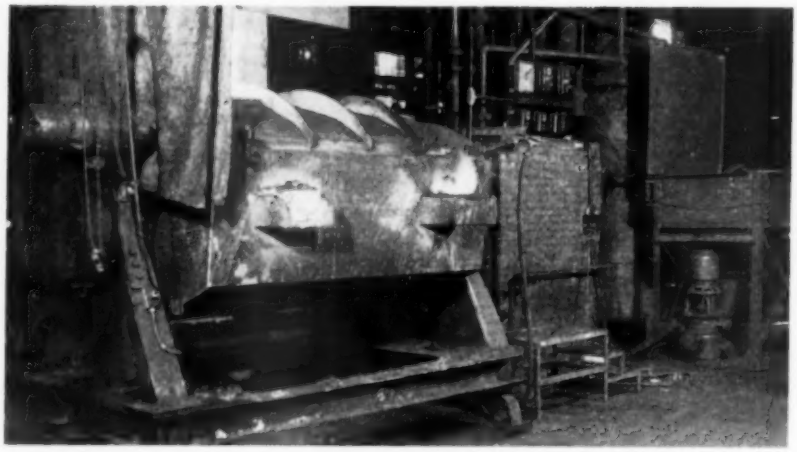
Proper Bushing Essential

Proper bushing for the particular type of chisel being used is extremely essential. Most manufacturers make different types of handles and triggers for their chipping hammers. It has been found advantageous to select the proper handle for the particular type of chipping being done. Figs. 2, 3 and 4 show the various handles available. In this shop, only the type of handle shown in Fig. 2 is used. It was found on trying the other types that the men were not as well satisfied, nor nearly as efficient as when given the type that they themselves prefer. This handle seems to have considerable effect on the ease and lack of soreness in a man's hand. The type of hose connection to the handle affects the weight the man is carrying, particularly so when working in a more upright position.

The chisel must be selected for the type of work to be performed. Diameter and length are quite important. Experience showed that it was necessary to shorten the chisel lengths as much as 2 in. when the plant changed from the spool valve type of hammer to the plate valve. This was due to the greater amount of vibration in the longer chisels with the faster hammer. The use of the shorter chisel results in a small saving in the original cast of the blank; however, in both cases the chisel is used until it has been shortened approximately 2 in. from its original length.

(*Continued on page* 232)

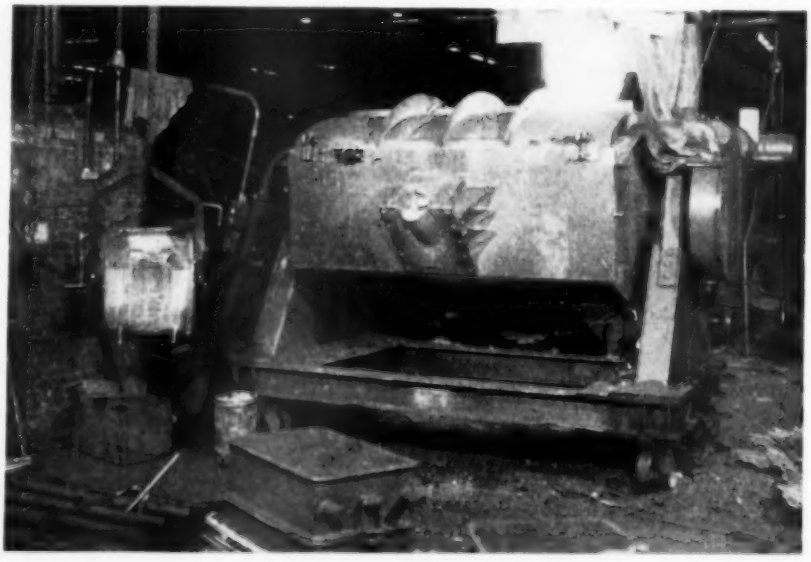
Holding Furnace Keeps Metal Hot

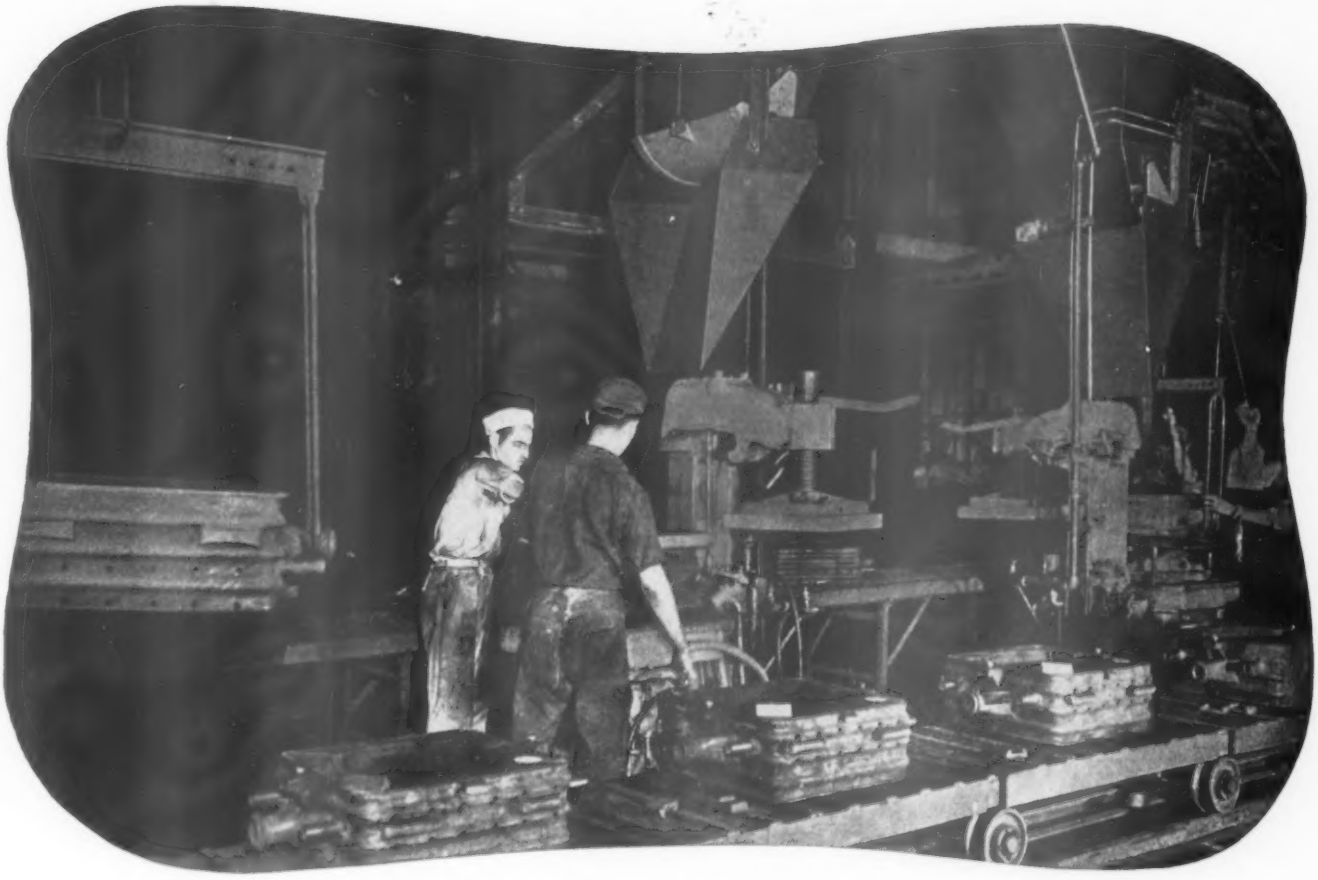


ELIMINATION of temperature loss in the holding furnace or forehearth employed as a mixer for cupola metal has been accomplished in a new unit fired with pulverized coal. Known as the Whiting Heated Metal Mixer, it was developed by the Whiting Corp., Harvey, Ill., and is intended especially for use where small, thin-sectioned castings are poured continuously on a moving conveyor.

Accompanying illustrations show the mixer, two of which have been installed at the Trafford, Pa., foundry of Westinghouse Electric Corp. Metal is transferred from the cupolas in a top-pour ladle to the 3-ton holding capacity mixer, which is located adjacent to the mold conveyor. Metal temperature is maintained and even increased somewhat above that of the cupola metal. Composition is held uniform and adjustments may be made in the furnace if desired. Slightly more than 1 ton of hot metal is being poured per hour, although the equipment is rated at 2 tons per hour.

The mixer is fired with a No. 1 pulverizer having a capacity of 100 lb of coal per hour. Tilting mechanism of the unit is operated by a pendant push button control. Overall floor space required is 8 x 28 ft.





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(*Continued from page* 230)

Effectiveness of chisels of various hardnesses is a study that must be made relative to the types of steel being chipped. For example, in this shop during the war period two types of steel were being made. One type was of relatively low carbon with no alloy, and the other of higher carbon, higher manganese, chrome alloy. At first, this presented a difficult problem in chipping. Upon examination, it was found that most of this chisel hardness problem was psychological. After a thorough study, a standard chisel hardness of 48-50 Rockwell C was adopted which was very satisfactory on both steels. The chisels as heat treated at this works will properly chip steels of a brinell hardness of approximately 150 to 230. Toughness of the steel, in addition to actual hardness of the steel, is an important factor in chipping.

Outlines Hardening Procedure

The chisel hardening process is as follows: The blacksmith forges the chisels with a steam hammer. This operation is performed with a die so that the correct shape is always obtained. Then, the chisels are heated on the cutting ends only, to 1650 F in a lead bath, followed by a water quench. Then they are tempered in a salt bath at 440 F and air cooled. From this treatment, one obtains from 48 to 50 Rockwell C hardness. The only rules that can be used to cover chisel hardness for different types of steel are those gained by one's experience or those recommended by tool manufacturers. This has been the author's experience in this matter.

Shapes of chisels must be given consideration. Figs. 5, 6, 7 and 8 illustrate some chisels employed at the Granite City Works. Most of the chisels used at this plant are flat, but many other shapes are used as well—half rounds, both large and small, bent at different angles, small diamond shaped gouges and drifts.

The author wishes to stress the importance of grinding chisels properly. During the last 12 years his plant has changed entirely from having each chipper dress his own tools to dressing all of the tools in the tool room. There are no grinders available for the chippers to do any dressing of their own tools. This was not accomplished over night and it was found to be a very difficult job to break away from the old habit of each man dressing his own tools.

At first old and experienced shippers were trained to be skilled chisel grinders. This had advantages over

(*Continued on page* 234)

MAXIMUM PRODUCTION in LIMITED FLOOR SPACE

DESPATCH Core Baking Oven

HERE'S HOW a critical production-floor space problem was solved for a midwest foundry with a DESPATCH Conveyor Oven:

- CAPACITY: 7000 lbs. per hour, 84 tons per day.
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DESPATCH engineers designed this compact, horizontal, multi-pass oven of continuous-conveyor type 13'x32' x27' (high) to meet space and output requirements. Its platform-mounted heater, fans, gear boxes and controls permit core-makers to work on the floor below.

Coremen have convenient loading and unloading, with work space all around the moving carriers. There are 38 conveyor racks, each with 4 adjustable shelves for various-sized cores. Conveyor speed adjusts to variable baking time from 1 to 4 hours.

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Baking is *fast* and *uniform* with forced convection heat, horizontal air flow and automatic controls. A combination direct-fired gas-oil heater provides 3,000,000 BTU per hour, with 25% overload possible. Temperatures average 450-550°F., with 650° F. maximum. Heat is circulated by a powerful 23,000 CFM fan, with 75% recirculation.

*Available in most any size and capacity

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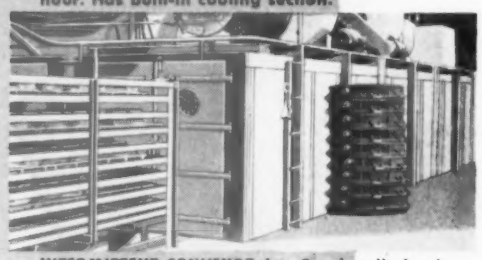
VERTICAL CONVEYOR oil-fired Despatch Oven. Bakes up to 5000 lbs. of large or small cores per hour. Has built-in cooling section.



INTERMITTENT CONVEYOR (on floor) pulls load-racks thru 40' chamber. Bakes 4800 lbs. cores per hour. Has large, dual, oil-fired heaters.

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(*Continued from page* 232)

the previous method. There was still some trouble in maintaining the proper angles on the tools and the problem of grinders burning the tools, hence spoiling the temper and making them ineffective. After running experiments on old tool grinding machines in this shop, it was concluded that a machine-ground chisel on a wet stone was desired. It took considerable time and experimenting before the plant found a company that was willing to build such a machine. In 1941 the first chisel grinding machine built to the plant's specifications was delivered to us. The general specifications of this machine are as follows: 1 1/2-hp motor 1750 rpm, 220 or 440 v 3 phase. The wheel is 10 1/2 x 1 1/2 x 1 in., cup shaped with grinding face on the side of the wheel, which is a pad 1 x 2 in. Soluble oil is used as the grinding fluid. This is a double end machine that can be operated by either one or two operators, depending on the quantity of tools needed per hour. The average operator will produce properly ground chisels at the rate of 72 per hour.

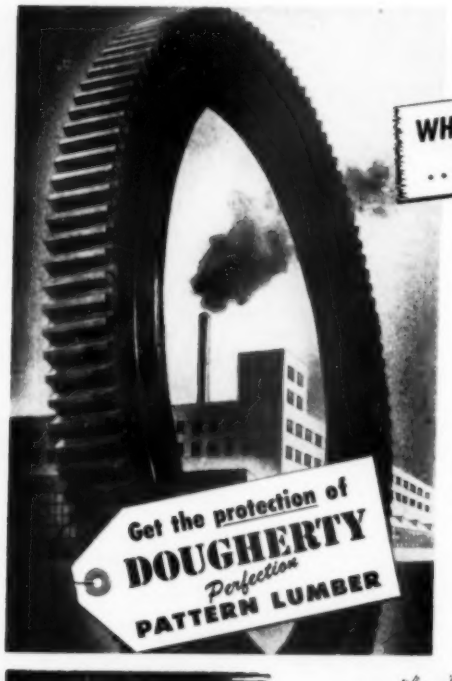
TABLE II.—CHISEL GRINDER DATA

	Wet Grind	Dry Grind
"A"—Grinding per reforging	4.8	4.4
"B"—Average time to grind one chisel	.46 min.	.42 min.
"C"—Average number reforges per chisel	15	15
"D"—Rough chipping increase with wet grinder over dry grinder	43½%	

It is insisted that the coolant flow over the wheel at all times and that chisels be ground to a 45° included angle regardless of length of tool. The effect of such an angle is illustrated in Fig. 9. After a great deal of study, it has been determined that this is the proper angle to dress a chisel for this type of work. Since adopting this procedure, a longer tool life has been obtained, resulting in a much cheaper chisel cost, as shown in Table II. At present, special shapes of chisels are ground by hand. Such a special shape is shown in Fig. 1.

Chippers are equipped with a generous supply of chisels. Different methods of limiting the number issued to men have been tried but, after studying this situation, it was found that it is more economical to supply the chipper with as many good tools as he needs to do his work. The grinding stations and shop toolroom, which is just a storage place for hammers that are not in daily use, is located on the chipping floor. When a chipper needs more chisels he simply goes to the tool room, drops his used

(*Continued on page* 236)



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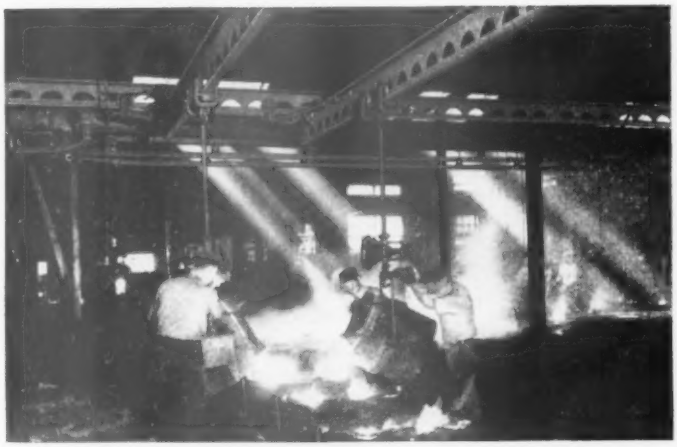

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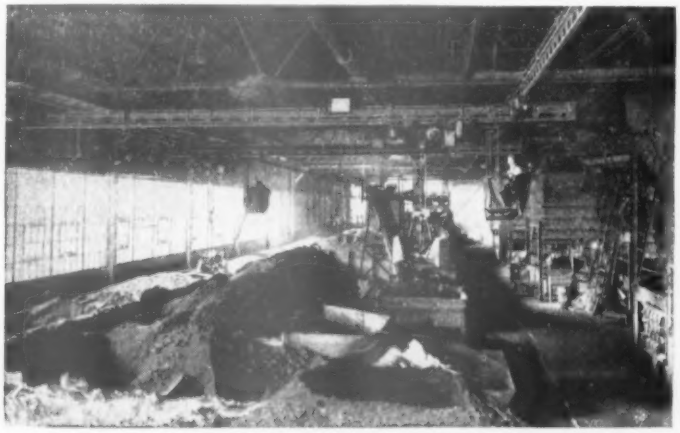

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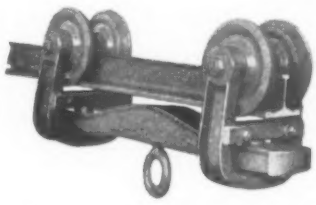

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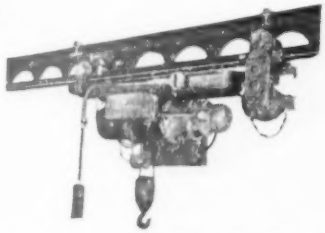

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(*Continued from page* 234)

tools in a chute that delivers them to a grinder, and picks out of a box the same number of chisels that he had turned in for regrinding. Since installing this tool grinding system, it has been found that chisels need to be dressed in the forge shop less frequently than when the previous system of tool grinding was employed.

Finally, let us consider the chipping procedure. The positioning of castings for chippers should be studied relative to the operation to be performed. It has been found that the men work most effectively when their work is placed at a height of 28 to 30 in. above floor level, as shown in Fig. 10. Several different heights were tried and it was found that the men claim less fatigue working at this specified height. The author does not think that this height would hold true where men were doing work other than actual chipping in connection with their chipping operation.

Safety Viewpoint Stressed

In some shops he has observed chippers who will chip for a relatively short period, and then use their tools such as grinders for an equal or greater period. Where work of this nature is being performed, it is recommended that work be placed at a higher level. In locating work, the utmost care should be exercised from a safety viewpoint. The handling of castings to and from the worker must be watched, both from the standpoint of disturbing the other workers and also from a safety angle. This plant tries to supply its piece-work chippers with sufficient working space so that one group of castings can be moved to the next operation without disturbing the men while they are working on similar castings.

In a previous paragraph it was mentioned that the rates are established by time study. The plant adopted a 20 per cent personal, fatigue and delay allowance as being the proper figure to use on this occupation. This can become a somewhat controversial subject but it is believed to be a fair and accurate figure. Figs. 11 and 15 illustrate the various positions which the operator is required to assume in chipping, as justification for the 20 per cent figure.

In the previous remarks on training chippers little mention was made of the numerous things that a chipper must learn to be able to perform his work properly. One of the important things is the selection of the proper tool to chip the particular job on which he is working. The variety of tools avail-

(*Concluded on page* 238)

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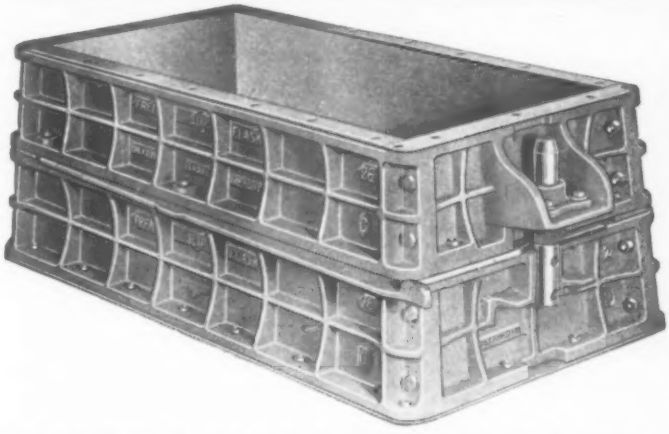

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(Concluded from page 236)

able is illustrated in Figs. 5 to 8. For example: Choosing the right half-round bent at the proper angle to remove certain metal in a place otherwise inaccessible on the casting; and selecting the proper size drift to use on certain holes in the castings depend upon the chipper. Some of the drifts are ground to only a 1/32-in. clearance above the pin size.

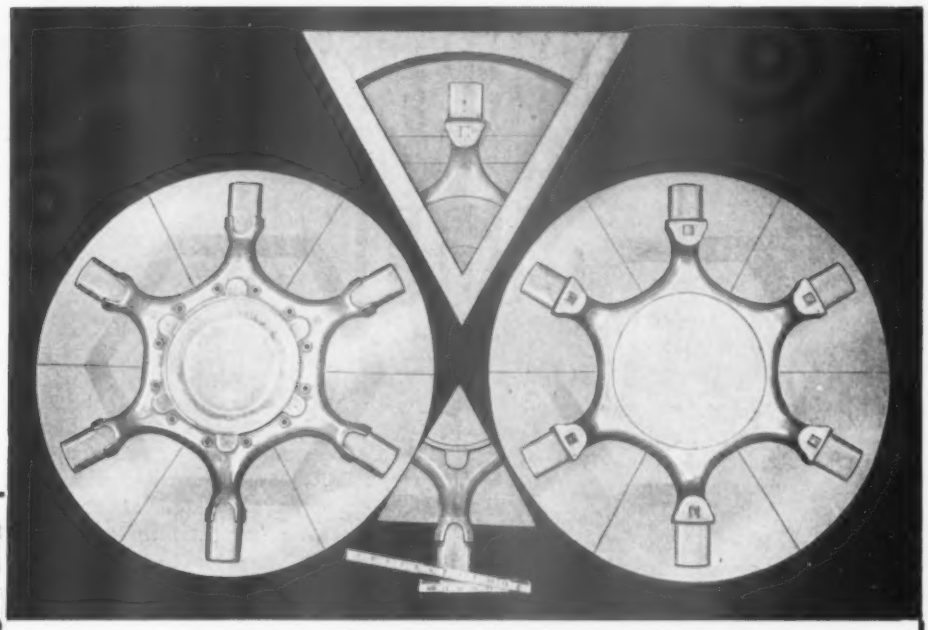
Another important part of the chipper's training in order to qualify as a finished chipper is his ability to know what to chip on a casting. For example: Many cracking strips are used on the casting. Where strips do not interfere with use of the casting in service, many of them are left on the casting. It is the chipper's responsibility to know which strips are to be removed and which are to be left on the casting. The cleaning room uses inspectors with the chippers to aid the foremen and the chippers in doing the work properly. Since the men are doing piece work, it is necessary for someone to check each casting during the chipping operation to be sure the chipper completes his task properly.

Work Is Divided

It might be added that the chipping operation is broken down into two separate operations, termed, in this shop, "rough chip" and "finish chip." In the rough chip operation practically no gages are used on the castings, but in the finish chip operation there are 30 gages used on each side frame. About one-half of these gages affect the chipper's work. While all care possible is taken to cast the gaging points on these castings to the proper dimensions, it still becomes necessary in some cases to chip for a proper gage fit. In the finish chip operation, the chipping done is generally of a much lighter nature than in the rough chip operation. More care must also be taken in this operation to keep from spoiling corners and edges of the bearing points.

Chipping costs are so closely related to the type of casting, shapes, degree of finish necessary, analysis, condition of casting when chipped, and many other considerations, that to attempt to make a generalization on this is impossible. The figures for the type of work at the author's plant would tend only to confuse and mislead those where only general statement that can be made concerning chipping is that it is a costly operation.

Illustration at right shows cope and drag equipment for truck wheel, made from one spoke (1-6) of wheel. Photograph by courtesy of Erie Malleable Iron Company.



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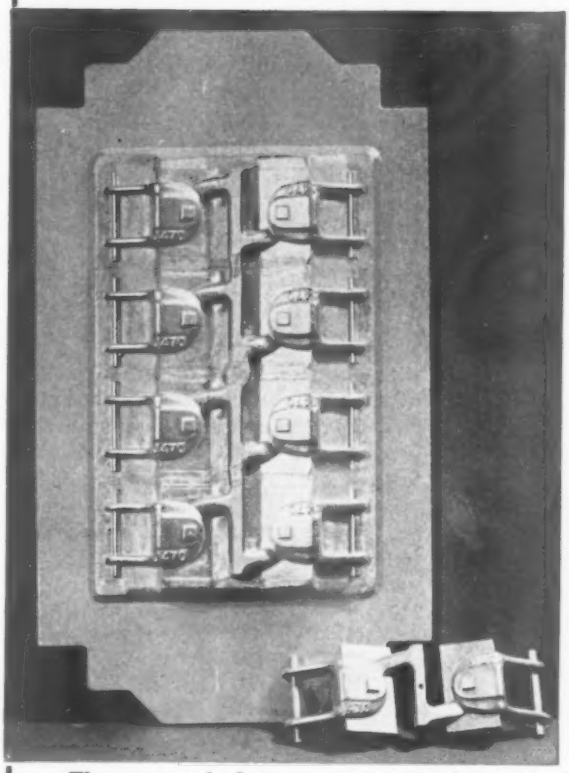

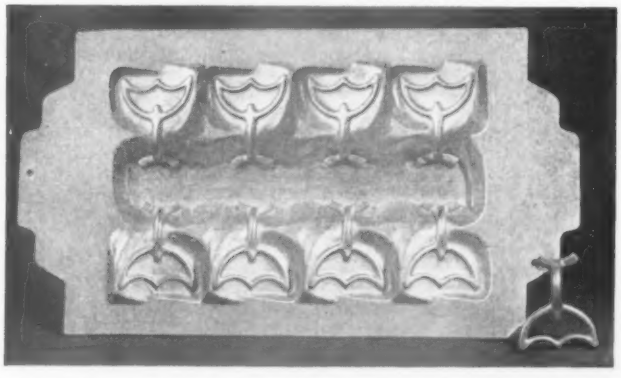

These matchplates were made from single-gated (*left*) and master patterns (*right*), respectively.

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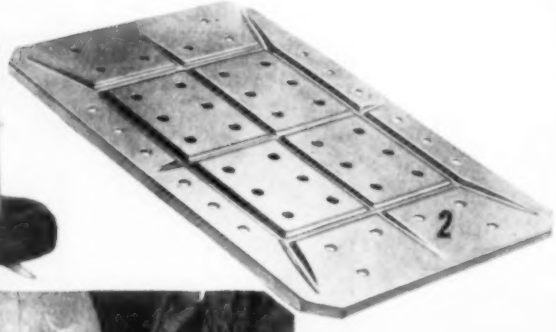
PROFIT BY OUR MANY YEARS OF EXPERIENCE

New Equipment and Supplies

(1)—Hoist: Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24—Electric cable hoist has stiff arm permitting manual spotting of a load to close tolerances. Stiff arm also makes it possible to move the hoist to exact locations without the use of a trolley motor, it is claimed. The stiff arm is built so that it can be used laterally to push a bridgebeam or jib (on which the hoist may be mounted) as well as to push the hoist itself in the transverse direction. Electric hoisting and lowering push button controls are located at the lower end of the arm and make it possible for the operator to control vertical, as well as horizontal, motion of the load with one hand. Various lifting speeds and lifting heights are available, and the equipment requires only 15¼ in. headroom. Hoist is offered in 500, 750, 1000 and 1500 lb capacities.

1

(2)—Bottom Board: Edw. S. Christiansen Co., 1 North LaSalle St., Chicago 2—Magnesium bottom boards are lighter than wood and are said to have greater durability and extreme heat resistance, also withstanding normal run-outs and spills of molten metal. Used as a combination squeezer and bottom board, they are said to offer firm, equal pressure distribution and reduce mold shifts, breaks or cracks. They are specially vented to permit escape of gases. Boards are available in a complete range of standard sizes, and special sizes will be made upon request.


2

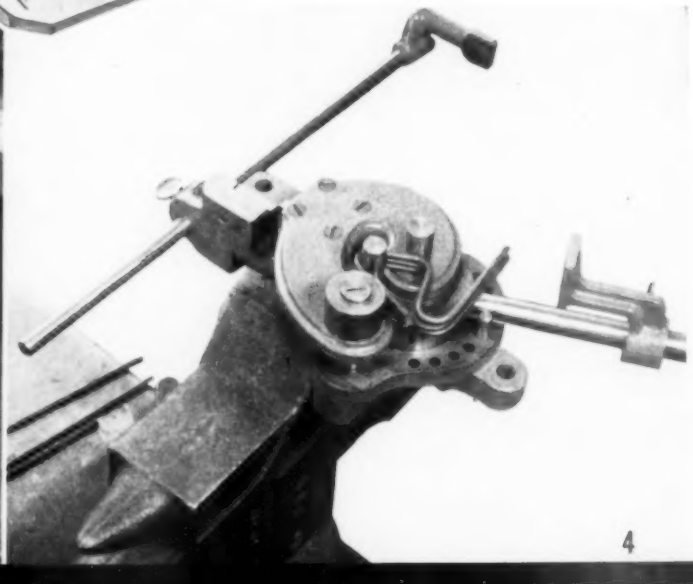
(3)—Holding Magnet: Dings Magnetic Separator Co., 4708 East Smith St., Milwaukee 7—Electromagnet is designed for holding heavy castings of any shape securely in position under a swing grinder, eliminating need for blocking, wedging or clamping. Wearing plate on which castings are placed is renewable. Holder is available mounted on a tilting trunnion with seven positions controlled by a foot lever, or can be supplied as a base magnet. Built in two sizes with magnet face 16 x 29½ in. or 16 x 16 in., the holder requires 115 or 230 v dc for operation; consumption of the larger is 600 w—the smaller, 400 w. A hand or foot switch is provided to turn the magnet on and off.

(4)—Wire Bender: Redford Iron & Equipment Co., 21315 West McNichols Rd., Detroit 19—Cutter and bender is a small, powerful tool which will cut, bend and duplicate core wires and other wire parts up to 5/16 in. in diam and band iron up to ⅛ x 1 in. Easy to use, the tool can be bolted to a bench or held in a vise. It has replaceable knives and bending pins.

Linestarters: Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30—Linestarters are designed for use with dc motors up to 5 hp on circuits of 80, 115, 230 and 550 v which may be safely started by connecting directly to the line. They have passed all tests of the U. S. Bureau of Mines for "explosion tested" equipment and may be used on "permissible" machines

(*Continued on page* 242)

3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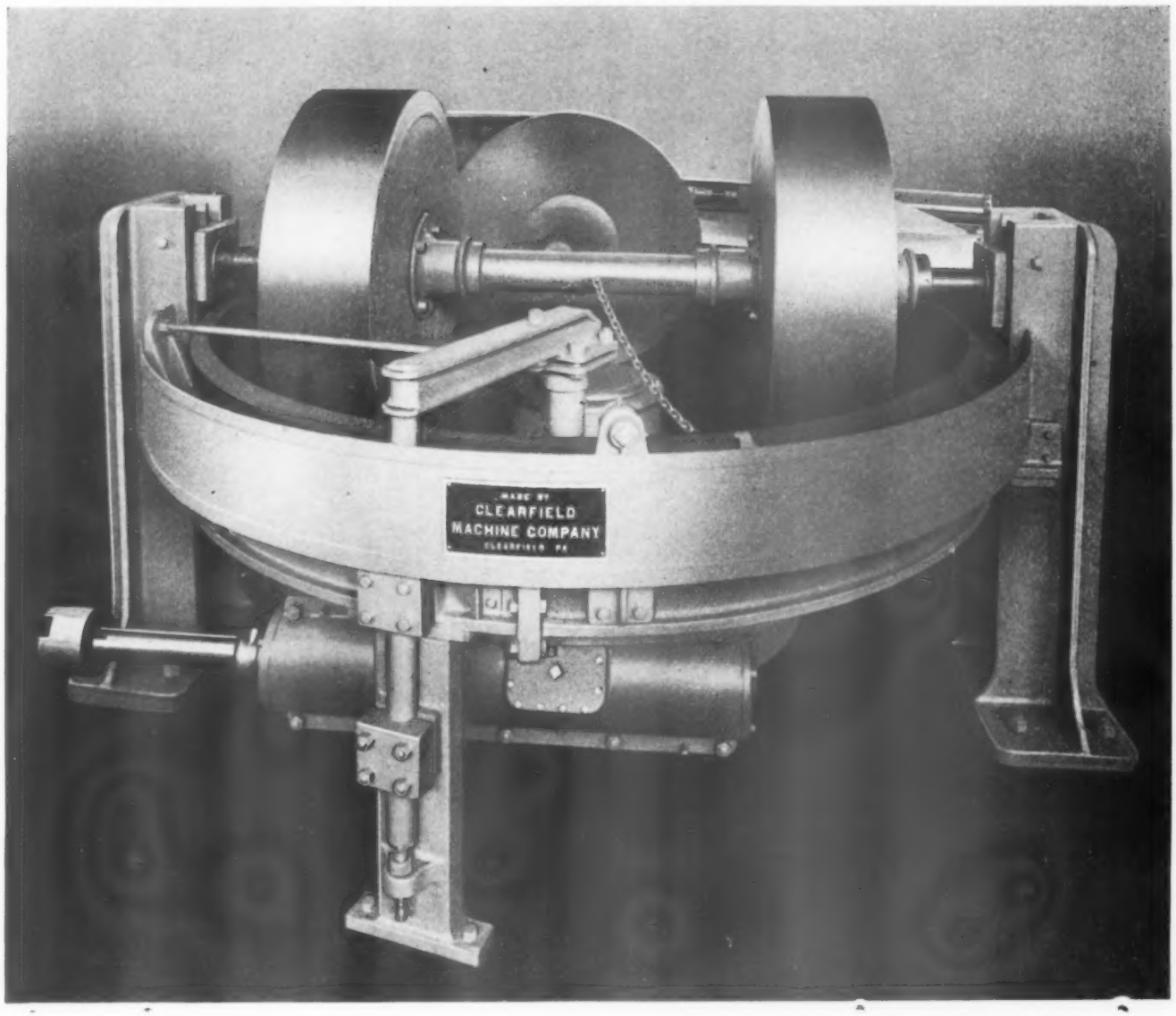


Built to take it

CLEARFIELD MIXERS

All Clearfield mixers are built to last. Manufactured with generous section and substantial weight they will stand up in hard continuous use. High test cast iron and alloy steel are used to provide resistance to vibration and abrasion.

All working parts move with the flow of the sand, resulting in smooth, easy operation. Great care is taken in the design and construction of the bearings, and all important bearings are of the roller type. Convenient lubrication has been provided for, and complete protection against dust and dirt is assured.

The combination of these factors provides quiet, vibrationless operation, freedom from wear and ease of starting with minimum consumption of power. For complete information, write for Catalog No. 79.

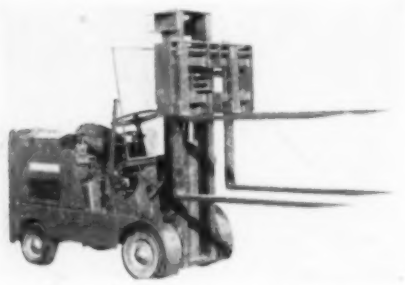
CLEARFIELD MIXER
MIXES, TEMPERS AERATES

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

(*Continued from page* 240)

when applied in accordance with Bureau of Mines regulations. They have an overload relay that can be arranged for either manual or automatic resetting. Pushbutton and reset button are mounted in the cabinet cover, although pushbutton may be located remotely if desired.

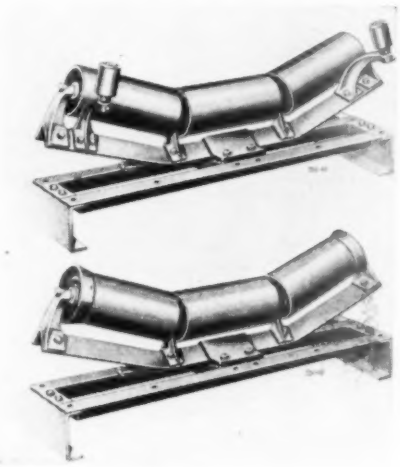
Oven Charger: Towmotor Corp., 1226 East 152nd St., Cleveland 10—Special lift truck attachments, including a large, heat-resistant blue-



colored glass shield, a double set of forks and a pair of tire guards, are designed to adapt the truck to charging heat treat ovens with castings. Glass protects operator from furnace glare and heat; wheel guards protect tires from heat. One set of the dual forks rises 25 in. before the second set starts to rise. Regardless of the height to which the carriage is raised, the 25-in. spacing is maintained. This enables the operator to pick up two separate containers of castings and place them on separate shelves in the furnace. Truck used for this installation has 4000 lb capacity, nontelescopic lift and maximum lifting height of 65 in.

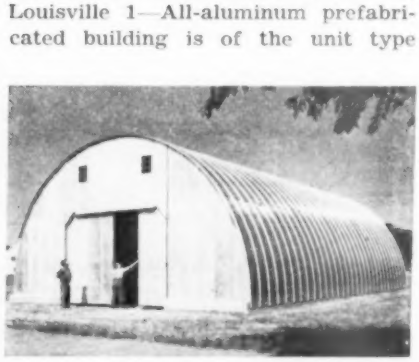
Hard-facing: Metallizing Engineering Co. Inc., 38-14 30th St., Long Island City 1, N. Y.—Smooth, uniform, relatively thin hard coatings are applied by using a metallizing gun and a wire composed of powdered hard-facing alloy extruded with a plastic binder. During the spraying operation the plastic binder is volatilized and the deposit consists entirely of the metallic constituent. Subsequent fusing with any fusing torch or with an attachment on the metallizing gun, results in a coating alloyed to the base and said to be physically and chemically identical to hard-facings of the same alloy applied by other methods. The alloy is claimed to have good resistance to abrasion, corrosion and oxidation; a low melting point with a long range of plasticity (1850 to 2050 F) and high strength at red heat.

Belt Idlers: Jeffrey Mfg. Co., 907-99 North Fourth St., Columbus 16, O.—Self-aligning belt idler for belt conveyor service is designed to correct immediately the slightest misalignment of the belt. Both types of self-aligning idlers shown here



have ball bearing pivotal mounting at the center. The arm-type idler, suitable for situations where a consistent tendency for an unusual amount of misalignment exists, is shown at the top. Lower view shows the brake wheel type troughing idler with flared, adjustable friction-type end rollers. This type is adapted to reversible belts. Idlers can be furnished with either 5 or 6 in. diam rollers for belt sizes from 14 to 48 in. in the positive type and from 18 to 48 in. in the brake wheel type.

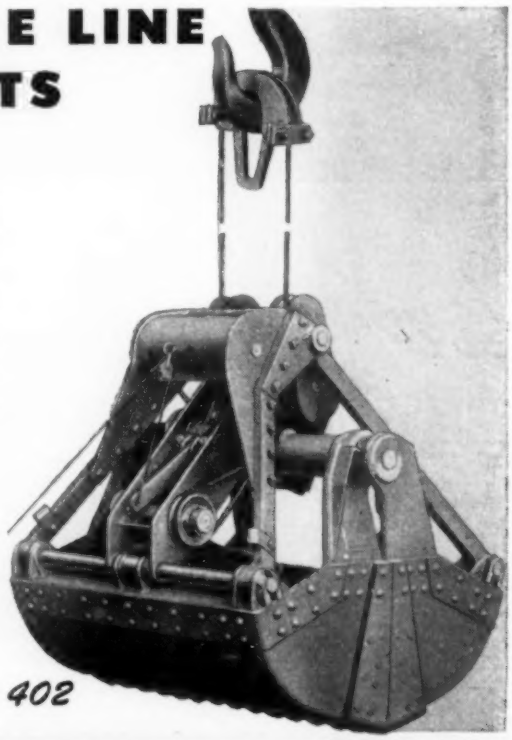
Prefab Building: Reynolds Metals Co., 2500 South Third St., Louisville 1—All-aluminum prefabricated building is of the unit type



with self-bracing arch roof. It is said to be a good, weather-tight building which withstands high winds and heavy snow loads. Standard 36 x 60 ft unit on a 1-ft foundation provides 5220 cu ft of space. Standardized 6-ft sections allow the length to be

(*Continued on page* 244)

ERIE SINGLE LINE BUCKETS



ILLUSTRATED is the hook-on type, for intermittent service. It is reeved and ready for operation on overhead traveling crane, monorail hoist, locomotive crane, derrick, ships tackle or any other hoisting device which has but a single hoisting drum available for bucket duty. Just slip the yoke over the crane hook.

Erie Single Line buckets are also available in the direct-reeved type for permanent installation. Describe your Single Line bucket need — we'll give you our recommendations for we build all types and sizes.

● *Write for Booklet 402*

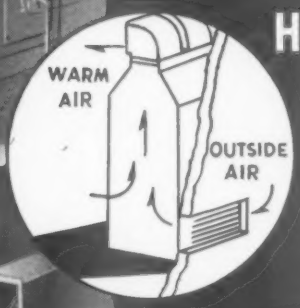
ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 10711 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

foundry ventilating

with DRAVO COUNTERFLO HEATERS



When you establish comfortable working temperatures year 'round it's certain to show up in improved efficiency and higher morale among workers. In foundries or metal working shops, the reduction of smoke, fumes, and airborne dust by the introduction of clean, tempered fresh air is the first big step in establishing comfortable working conditions.

And you can accomplish these results quite readily by installing Dravo Counterflo Heaters. Characterized by their large air-handling capacity, and efficient method of air distribution, Dravo Counterflo Heaters are ideally suited for foundry ventilating during summer and winter seasons.

Here are some of the DRAVO features of importance in foundry heating and ventilating:

- Introduction of clean, tempered fresh air to replace exhausted air
- Heaters easily installed directly in working areas or connected to a distributing duct system
- Air-handling capacities ranging up to 22,000 CFM per unit
- Gas, oil, or combination burner systems for direct-firing in stainless steel combustion chambers

Dravo Counterflo Heaters can be shipped from stock so that you can take full advantage of the ventilating features during every season and have adequate heat available, instantly, when it's needed. Write or wire for descriptive Bulletin FQ-516.

DRAVO CORPORATION

Pittsburgh • Philadelphia • Cleveland • New York • Chicago • Detroit
Atlanta • Wilmington • *Sales Representatives in Leading Cities*

DRAVO

USE
SCIENTIFIC
Pressure Cast
MATCH PLATES
For PRODUCTION CASTINGS
COPE AND DRAG PLATES
UP TO 40" x 60"
The SCIENTIFIC CAST PRODUCTS Corp.
1388-1392 EAST 40th STREET
CLEVELAND 3, OHIO
2520 WEST LAKE STREET
CHICAGO 12, ILLINOIS

(*Continued from page* 242)

varied as desired. Inside sliding doors at each end of the building are 11 ft high and 16 ft wide. Maximum interior height is 19 ft with 1-ft foundation.

Fume Exhauster: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8—Portable welding fume exhauster is designed for use in welding operations where stationary ventilating systems are unavailable or impractical. It is said to remove welding fumes, sparks and slag. It weighs 25 lb, is 34 in. long, 10 in. in diam and is completely self-contained, requiring a minimum of maintenance.

Hammer: Bernard Welding Equipment Co., 741 East 71st St., Chicago—New weld cleaning hammer has five separate pick-pointed hammer heads, each free to slide 3/8 in.,

mounted on a single handle. When a blow is struck, each of the five head segments is said to strike with equal impact at five different points regardless of surface contour. Hardened and tempered tool steel head segments can be resharpened on a grinding wheel in the same manner as an ordinary chisel. The 3/8 in. steel shank and the segments are cadmium plated. Hickory handle has lock pin to prevent turning under heavy usage.

Power Machine: Wyzenbeek & Staff Inc., 838 West Hubbard St., Chicago 22—Flexible shaft machine is described as a three-speed, v-belt drive machine made in two speed ranges—1400, 2400, 4500 rpm and 1800, 3600, 7200 rpm. V-belt drive is enclosed by a guard which can be raised to change speeds, and machine has a locking device which will hold shaft and grinding wheel in fixed position for stationary grinding. Five models are available, including bench and floor type machines in 1/3 and 1/2 hp.

Combustion Furnace: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Laboratory combustion furnace is suitable for the combustion

of test samples for either carbon or sulphur determination in inorganic or organic materials. Electronic automatic temperature controller maintains temperatures within 3 per cent at any selected temperature up to 2700 F.

Compass: Omicron Co., 532 West Windsor Rd., Glendale 4, Calif.—Beam compass designed by a draftsman engineer uses the flexible-rigid type of retractible steel tape on which instant radius settings up to 72 in.

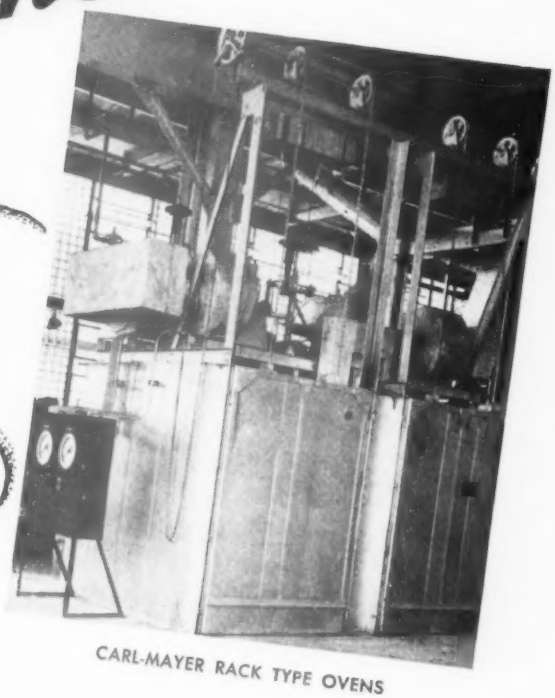
may be made. Tape is printed with a legible scale and is held at any radius setting by a brake on the case. Accurately machined head holds a standard drafting pencil lead, common lead pencil or a steel scriber.

Grinder: Speedway Mfg. Co., 1834 South 52nd Ave., Cicero 50, Ill.—Portable bench grinder has one-piece cast aluminum case, which houses motor, shaft and bearings and provides integral wheel guards and tool rests. It weighs 7 1/2 lb complete, has a 1/15-hp, 110-120 v, ac

(*Continued on page* 246)

Carl-Mayer Ovens

SELECTED FOR NEW FOUNDRY



CARL-MAYER RACK TYPE OVENS

It is logical that the new foundry of a well known concern (name on request) should call for the most modern, efficient and economical operating equipment. Such equipment is not chosen without careful study and comparison by foundry engineers.

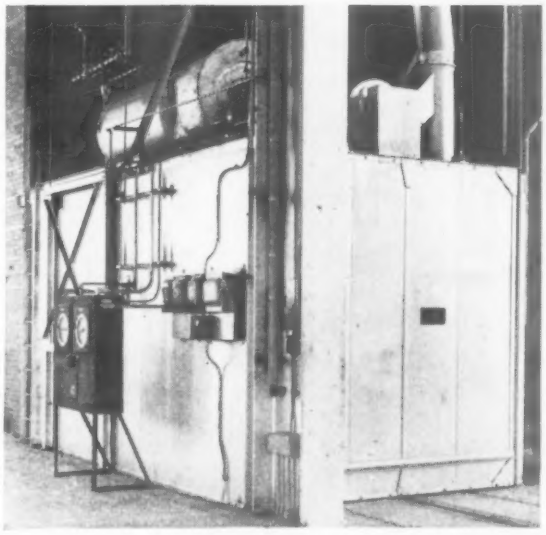
CARL-MAYER OVENS ARE OUTSTANDING. The design and exclusive recirculating heating system ensure the most dependable baking at low fuel cost.

CARL-MAYER OVENS are backed by more than 28 years' of outstanding developments in the core and mold oven industry.

●

NOTE PARTIAL LIST OF USERS AT RIGHT. Would concerns like these order Carl-Mayer Ovens repeatedly unless there was a definite advantage in doing so?

Write for Bulletin showing various types of Carl-Mayer Ovens.



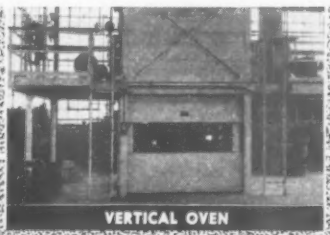
CARL-MAYER CAR TYPE OVEN
WITH CONTINUOUS CAR PULLER

TYPICAL CARL-MAYER CUSTOMERS:

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
Union Brass & Metal Mfg. Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

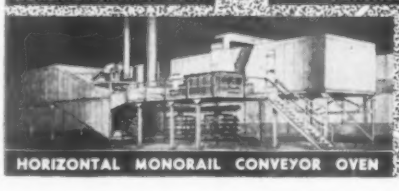
ROLLING DRAWER OVEN

PORTABLE RACK OVEN



VERTICAL OVEN

CAR TYPE OVEN

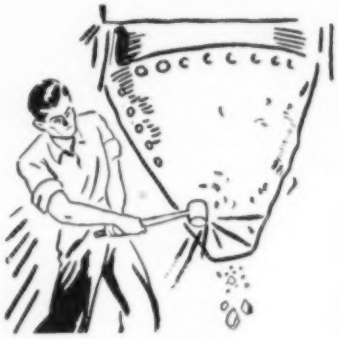


HORIZONTAL MONORAIL CONVEYOR OVEN

The CARL-MAYER Corp.
3030 EUCLID AVE. CLEVELAND, OHIO
CORE AND MOLD OVENS

"tattle-tale"

Hammer Marks on Your Bins and Hoppers?

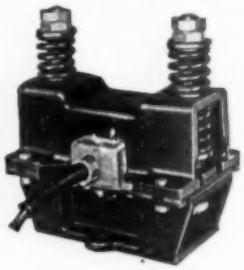


That tell of lost man-hours and slowed-up production?

SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS



Keep Bins, Hoppers and Chutes Open and Free-Flowing

—by controlled, pulsating vibrations that penetrate the mass—activate each particle and break down arching and plugging.

Eliminate hammering and pounding.

Write for illustrated folder.

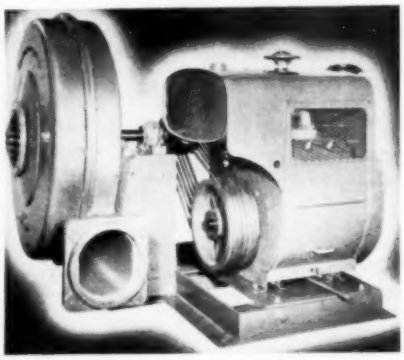
SYNTRON CO.

540 Lexington Homer City, Pa.

(*Continued from page* 244)

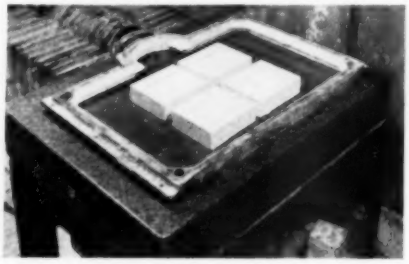
motor, operates at 3400 rpm and is equipped with two 4 1/2 x 3/8 x 3/8 in. grinding wheels—one coarse and one fine.

Turbo Blower: North American Mfg. Co., 4455 East 71 St., Cleveland 5—Air-cooled internal combustion engine powered turbo blower is



designed for emergencies caused by power failures. For combustion systems using oil burners, a built-in oil pump may be obtained. Governor on the engine maintains a steady speed for the turbo blower and oil pump, resulting in constant air and oil pressures. Unit is compact with engine, v-belt drives and impeller jackshaft easily accessible for greasing, cleaning or adjusting.

Stone: Herman Stone Co., 324 Harries Bldg., Dayton 2, O.—Granite block is used for a base when casting plaster molds. It is said to remain

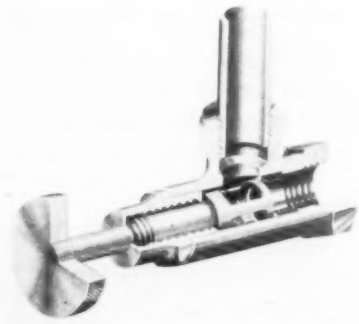


level over a long period of time and not to change shape because of temperature or moisture conditions.

Temperature Controller: Thermo Electric Mfg. Co., 480 West Locust St., Dubuque, Iowa—Stepless variable input temperature controller and indicator is designed to maintain a constant watt hour input and even temperature regardless of wide voltage fluctuations. Made for use with various makes of electric furnaces, ovens, melting pots, heating tanks and other heating devices, it operates on 5 to 20 watt hours. Instrument contains a pyrometer calibrated to 2000°F and 1100°C. A 4-ft color-coded thermocouple of 14 gage chromel-alumel is supplied. Eight models are available, covering current requirements of 115 and 230 v, 10 to 35 amp, and 25 and 50/60 cycles ac and dc.

Pipe Cleaner: Miller Sewer Rod Co., 4642 North Central Ave., Chicago 30—Rod made out of tightly spun music wire and propelled by a handle containing a small gear box is said to be capable of cleaning out every kind of pipeline. In operation, the rod is pushed into a clogged pipe until resistance is met. Then the handle is slid down the rod to a few inches of the pipe opening, locked in position, a crank turned, and the gear box forces the rod through the pipe. Unit consists of a rod, rod house and handle. Rods 50 ft long come in 1/4, 5/16, 3/8 and 1/2 in. diam with a 75 ft length available in the 1/2-in. size.

Valve: Knowles-Fisher Corp., Gowanda, N. Y.—New valve design is said to eliminate the valve seat, wash-



er and all wearing parts. It consists of a highly polished stem that engages with two wear-resistant synthetic rubber collars—one at each end of the valve seat. In opening, the stem is withdrawn from the lower collar, permitting an even flow of liquid through the outlet. The stem is retracted into the upper collar forming an absolute seal and preventing any moisture from entering the activating threads.

Grinding Wheel: Chicago Wheel & Mfg. Co., 1101 West Monroe St., Chicago 7 — Metallic sheathed vitrified or ceramic bonded grinding wheel is designed to dissipate heat generated at the arc of contact over the entire area of the wheel. Waterproofing quality of the metallic film on the sides of the wheel is said to keep the coolant at the arc of contact where it is needed for cooler cutting action and to avoid burning the work.

(*Continued on page* 248)

A ROLL CALL *that endorses* LANLY OVENS

Acme Electric & Mfg. Co.
Alleghany Ludlum Steel Corp.
American Fork & Hoe Co.
Apex Electrical Mfg. Co.
Atlantic Foundry Co.
Bell Aircraft Corp.
Boeing Aircraft Co.
Burnham Boiler Corp.
Carnegie Illinois Steel Corp.
Chase Brass & Copper Co., Inc.
Commercial Steel Castings Co.
Curtiss-Wright Corp.
Deming Co.
Eaton Mfg. Co.
Erie Resistor Corp.
Florence Stove Co.
Fulton Fdry. & Machine Co.
General Electric Co.
General Motors Co.
General Tire & Rubber Co.
Goodrich, B. F. Co.
Goodrich, B. F. Chemical Co.
Goodyear Aircraft Corp.
Goodyear Tire & Rubber Co.
Hall-Scott Motor Car Co.
Hobart Mfg. Co.
Homestead Valve Mfg. Co., Inc.
Hoover Co.
Jack & Heintz, Inc.
Jeffrey Mfg. Co.
Jessop Steel Co.
Manning, Maxwell & Moore, Inc.
n Shovel Co.
llins Mfg. Co.
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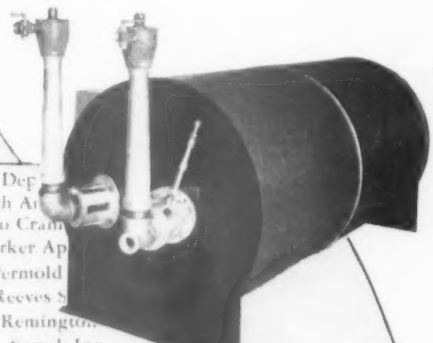
Motor
Navy Dep
North Al
Ohio Cran
Parker Ap
Permold
Reeves S
Remington
Servel, Inc.
Shenango-Penn Mold Co.
Timken Roller Bearing Co.
Twin Coach Co.
U. S. Rubber Co.
Unitcast Corp.
United Engineering & Fdry. Co.
War Department
Weatherhead Co.
Wellman Bronze & Alum. Co.
Westinghouse Elec. & Mfg. Co.
White Motor Co.
Youngstown Foundry & Machine Co.

INCLUDED among Lanly purchasers are many nationally known organizations – companies whose high standards and exacting demands, of themselves, constitute endorsements of the products they purchase.

The excellent reputation earned by Lanly ovens in a comparatively short time is due largely to their highly efficient convection type air heaters and balanced, re-circulating air systems.

Lanly builds all types of conventional ovens and special ovens and guarantees them to handle unusual or uncommonly difficult jobs.

Write for Catalog containing a list of purchasers and an illustrated description of the entire line.



LIFT DOOR OVENS
RACK TYPE OVENS
SHELF TYPE OVENS
COMBINATION OVENS
CONTINUOUS OVENS
CABINET OVENS

THE LANLY CO.

OVENS FOR INDUSTRY

HEATED BY GAS, OIL, ELECTRICITY OR STEAM

750 PROSPECT AVENUE • CLEVELAND, OHIO

SAHARA

Heat Resisting

BELTING

For Handling Hot Materials

Foundries have been using Sahara Beltings for over 25 years because they are unexcelled for conveying and elevating hot materials.

STANDARD SAHARA is for handling materials up to 300° F. INSULATED SAHARA, combining asbestos and special insulating material with the cotton base, is for use where sustained temperature of materials is from 300° F. to 450° F.

The effective heat resisting qualities of Sahara Beltings is due to special impregnation and insulation. The base of both Standard Sahara and Insulated Sahara is a 37½ ounce, tight-woven duck having a tensile strength exceeding 700# per inch of width. Our double-stitched and *Inner-Locked* construction is employed to permanently prevent ply separation.

May we send you additional information and prices?

Imperial INNER-LOCKED BELTING

Imperial Belting Co.

1755 S. Kilbourn Ave., Chicago 23, Ill.

Engineered Belting—

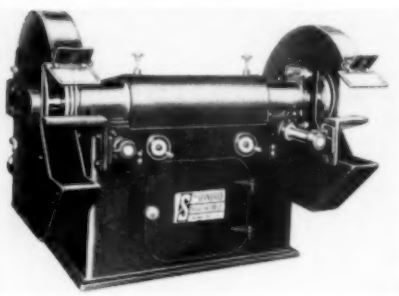
The Right Belt for Each Job

(*Continued from page* 246)

The film does not affect truing or dressing of the wheel, and is not detrimental to efficient grinding, it is claimed. Wheel is available in standard sizes and shapes.

Pattern Lacquer: Glidden Co., Berea and Madison Sts., Cleveland—Pattern lacquer for the preservation and identification of wood patterns provides a smooth surface to which foundry molding or core sand is said not to adhere, also to offer good resistance to water, oil, kerosene, heat, abrasion and to becoming brittle with age or usage. It is made in clear, clear orange, yellow, vermillion and black and dries in 15 minutes with a medium gloss.

Grinder: Standard Electrical Tool Co., 2507 River Rd., Cincinnati 4—Twin motor variable speed snagging grinder carries two 24 x 3 x 12 in. grinding wheels. Each wheel is independent of the other; one side may be stationary while the other wheel is operating; one side may be



operated with a wheel of different diameter than the other, but each wheel operated at its correct and efficient peripheral speed. Machine is designed for high-speed resinoid bond wheels and has an infinite operating speed range from 1480 to 2200 rpm.

Air Valve: Flex-Rite Valve & Mfg. Co., 118 South Cheyenne, Tulsa, Okla.—Simple blow valve allows operator to regulate air pressure to meet job requirements. Valves have no packing, no springs and no complicated parts and are said not to leak. Valve is available with either straight or angle nozzle.

Ointment: Vodine Co., 407 South Dearborn St., Chicago 5—New antiseptic ointment for treatment of minor wounds, cuts, abrasions and surface burns contains iodine but is said to be stainless, stingless, greaseless and odorless. It is applied as a light film over the entire affected area and does not have to be rubbed in. The medicinal agent is released when moisture from the skin acts on the ointment.

Respirator: American Optical Co., Southbridge, Mass. — Respirator is equipped with a new chemically treated dust filter which is designed to stop dusts smaller in diameter than 24 millionths of an inch. Filter is of

felt 1/8-in. thick and slightly over 5 sq in. in area. Its ability to prevent the passage of dust is said to be 40 times greater than untreated filters. The increased efficiency is accomplished without a proportionate increase in breathing resistance, it is claimed. Filter container is small, reducing the weight and providing increased field of vision for the wearer. Picture shows results of a test in which wearer was sprayed with carbon black.

Vibration Control: Korfund Co. Inc., 48-14 32nd Pl., Long Island City 1, N. Y.—Conical rubber-spring

vibration control unit has load capacity of 25 to 125 lb per unit It is said to be equally effective for pumps operating at 1750 rpm or compressors running at 450 rpm. It is designed

(*Concluded on page* 250)

Bindarene

USED IN GOOD FOUNDRY PRACTICE FOR 38 YEARS

An Organic

CORE BINDER

FOR FOUNDRY CORES FACINGS AND SPRAYS

★

Time tested for 38 years, BINDARENE continues to maintain a definite place in foundry practice today.

Working alone or as a partial substitute for oil, BINDARENE effects worthwhile savings in binder costs. Cores run freely and completely from castings, and require less venting. BINDARENE is equally well adapted to light or heavy work.

BINDARENE IPCO CORE BINDER

CORRESPONDENCE INVITED WITH FOUNDRY SUPPLY HOUSES AND MAKERS OF FOUNDRY COMPOUNDS

MODERATE PRICES

INTERNATIONAL PAPER COMPANY

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"RAPID" MOLDING MACHINES

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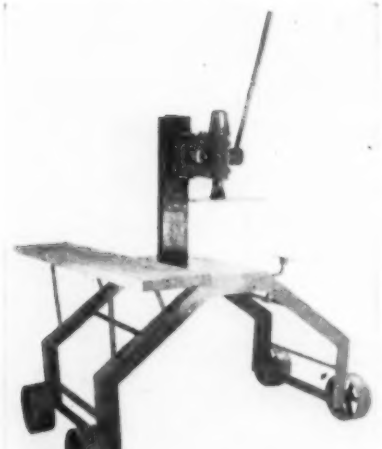
PORTABLE JOLT SQUEEZER R9X

WRITE for NEW BULLETIN "F"



PORTABLE HAND SQUEEZER R-10

PIONEER MANUFACTURING CO.

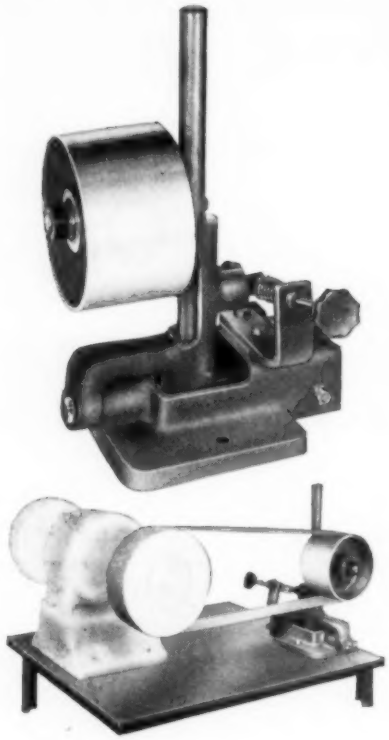
Molding Machine Manufacturer for Over 20 years

MILWAUKEE (West Allis) WISC.

(*Concluded from page* 248)

for use on compressor units, generator sets, motor generators, pumps, motors, fans and other machinery requiring an efficient, economical, standardized vibration isolator.

Bench Backstand: Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo 54, Mich. — Bench

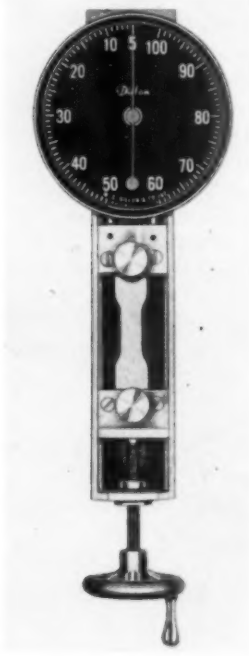


backstand converts existing wheel bench grinders into abrasive belt units for grinding, deburring and finishing. It is claimed that because grinding wear is on the abrasive belt and not on the supporting contact wheel, the contact wheel remains true with square corners and maintains its diameter and balance. Unit has cast iron base drilled for wood or metal bench installation; balanced aluminum pulley, 6 in. diam with 3 1/2 in. face and spring loaded belt tension adjustment operated by hand screw knob.

Interphone: Talk-A-Phone Co., 1512 South Pulaski Rd., Chicago 23—New model in the company's line of intercommunication systems is available in 10, 20, 30 or 40 station models. The system consists of one master station which delivers a maximum of 2 1/2 w of power. Basic systems, consisting of one master station and one substation, may be built up by adding substations as needed. Substations may be placed up to 3000 ft from the master station. System operates on 110-115 v ac or dc.

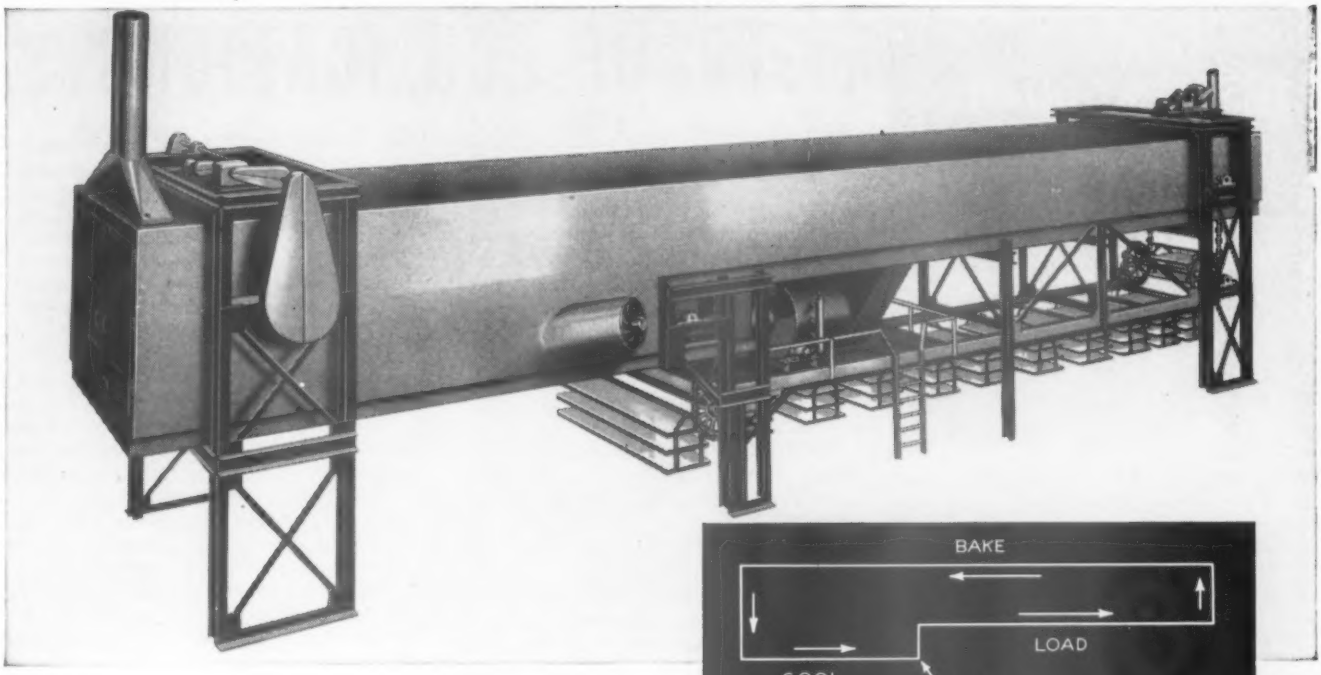
Motor: Electric Machinery Mfg. Co., 821 Second Ave. S. E., Minneapolis 14—Two-pole squirrel cage induction motor is designed for such high-speed applications as boiler feed pumps, oil pipe line pumps, centrifugal pumps, compressors and blowers. It is rated from 200 to 700 hp at 3600 rpm with NEMA class B starting (normal torque, low current) favorable for across-the-line starting. Motor is of drip-proof construction.

Strength Tester: W. C. Dillon & Co. Inc., 5410 West Harrison St., Chicago 44—Tester handles specimens in tensile and compression. Capacity is 100 lb in 1-lb increments with accuracy of 2 per cent of indicated load. Said to be uninjured by accidental overload or shock recoil the instrument will handle tensile specimens 1 3/4 in. wide and 1/8 in. thick or up to 1/8 in. in diam. Overall length is 15 in.; dial is 5 in. OD, and weight is 3 1/4 lb. Stroke is 3



in. (1 in. min, 4 in. max daylight opening) and grip face is 3/4 x 1 3/4 in., nonserrated.

Power Supply: General Electric Co., 1 River Rd., Schenectady 5, N. Y.—Self-excited, self-driven inductor frequency converter provides 3-phase power at frequencies from 360 to 2160 cycles, 1/2 to 150 kw and is suitable for high-speed ac motors used on grinders and drills. The self-contained unit consists of a cast rotor revolving in a stator having two windings. It is designed for easy operation, requiring only the attention given a standard induction motor.



The time-saving, space-saving, compact design of this new Horizontal Core Oven is characteristic of Young Brothers' Engineering. Into it went the skill and confidence of many years of experience . . . also a thorough knowledge of the job to be done and the production problems involved.

This new core oven can be installed in practically any building without making any major structural changes.

The coremakers are located right next to the oven so that they can load the cores directly on the moving racks thus eliminating the necessity of transporting them on hand trucks or a conveyor from the core room. The location of the coremakers, at the oven, also saves core room space.

The size of the loading racks can be varied and the shelves can be adjusted to accommodate cores of many sizes and shapes.

Besides allowing for the removal of exhaust gases at the point of greatest concentration, the new oven design provides an effective cooling zone for the cores and assures comfortable working conditions for the coremakers.

This New Horizontal Core Oven is Young Brothers' answer to the demand for better core baking equipment. It is YOUR answer to the need for lower production costs and higher operating efficiency.

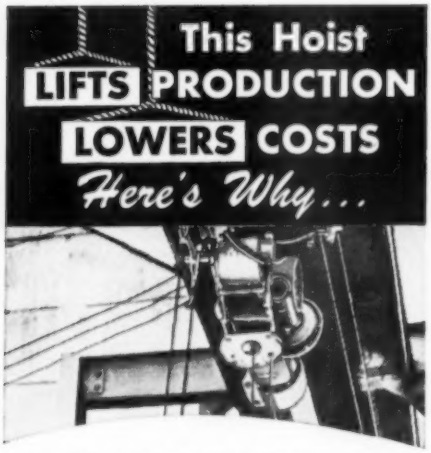
New HORIZONTAL CORE OVEN . . . . . offers many cost saving advantages!

MEMBER

YOUNG BROTHERS COMPANY

6508 MACK AVENUE DETROIT 7, MICHIGAN

ESTABLISHED IN 1896



Each READING ELECTRIC HOIST installed in your plant is "tailor made"—at no extra cost—to fit your own handling operation. As a result you get a hoist that quickly moves your materials safely and easily.

Then too, the simple design of a READING ELECTRIC HOIST gives you a sure way to cut maintenance costs. There are only four moving parts in the hoisting unit. Each part is "easy-to-get-at" for routine inspection and overhauling.

For more information on how you can step-up production and cut costs with READING ELECTRIC HOISTS, contact your nearest Reading Distributor. And if you haven't already sent for your free copy of "144 Answers To Your Hoisting Problems," drop us a line today.

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CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

...TRADE PUBLICATIONS...

ABRASIVE WHEELS: Carborundum Co., Buffalo Ave., Niagara Falls, N. Y.—Handbook presents practical methods for increasing production, improving workmanship and reducing costs with light portable grinding equipment. The wide range of wheel shapes and sizes, the variety of abrasives and coated abrasive discs, sleeves and cartridge rolls available for use on light-weight, high speed portable grinders are discussed and illustrated.

GEAR UNITS: Link-Belt Co., 2045 West Hunting Park Ave., Philadelphia 40—Booklet 1819 details and describes new sizes and types of enclosed herringbone gear units for speed reducing and speed increasing service. Included in the booklet are reducer selection data and examples of proper application, dimensions and horspower ratings, lubrication data, and tables of maximum allowable pull on high and low speed shafts.

QUALITY CONTROL: North American Philips Co. Inc., 100 East 42nd St., New York—Folder suggests control procedures that may be followed from the time material arrives in a plant until it is finally accepted or rejected. A number of standard forms needed in this phase of quality control work are illustrated. Also presented are some requirements covering a typical inspector training course.

DIE CASTING: Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York 5, Dept. SJ—Booklet deals with problems in die casting and the characteristics and applications of the various die casting alloys. It includes SAE, Army, Navy and aeronautical specifications; a chart on composition of steels for dies, and a table of dimensional and weight limits for die castings of various alloys.

BEARINGS: SKF Industries Inc., Front St. & Erie Ave., Philadelphia 34—Catalog offers information on increasing the rigidity and accuracy of machine tool spindles by the use of anti-friction bearings. Sections are devoted to applications, engineering principles and load data on bearings for various types of machines. Company's spindle bearing lubricator also is described.

TRUCKS and CRANES: Hyster Co., 2902 N. E. Clackamas St., Portland, Oreg.—Catalog 1074 pictures, describes and lists specifications on the company's line of lift trucks, straddle trucks and mobile cranes which are designed for operation on pneumatic tires. All the trucks are powered by gas engines and vary in capacity from 2000 lb lift to 300,000 lb lift.

ELECTROSTATIC PAINTING: Harper J. Ransburg Co., 1204 Barth Ave., Indianapolis 7—Booklet explains new principle of spray painting said to create a "wrap-around" causing an even flow of atomized paint particles to all exposed exterior contours of the product being painted. Typical electrostatic spray installations and a variety of electrostatic detearing operations are illustrated.

ELECTRONIC SCRIBER: Wheelco Instruments Co., 847 West Harrison St., Chicago 7—Bulletin C2 contains design, operating and specification data pertaining to the company's electronic scriber. Measuring, indicating, recording and controlling functions are explained with principal components illustrated and defined through the use of open-cut photographs and line drawings.

BUILDING MAINTENANCE: Stonhard Co., 403 North Broad St., Philadelphia 8—Leaflet discusses and illustrates building maintenance problems. It contains suggested solutions to such problems as leaky roofs, worn flashings and gutters, rough concrete and wood floors, concrete dust, spalled walls, loose pointing, etc.

MATERIALS HANDLING: Factory Service Co., 4615 North 21st St., Milwaukee 9—Booklet suggests how to achieve complete co-ordination of all steps in materials handling at relatively low cost. It offers many new ideas for making the most efficient use of floor space and contains illustrations or scientifically engineered handling methods.

PISTON RINGS: Double Seal Ring Co., 2065 Montgomery St., Fort Worth, Texas—"Double Seal Piston Ring Handbook for Engineers" is a condensed source of practical information for engineers, machine operators and designers, covering specifications, applications and recommended types of piston rings.

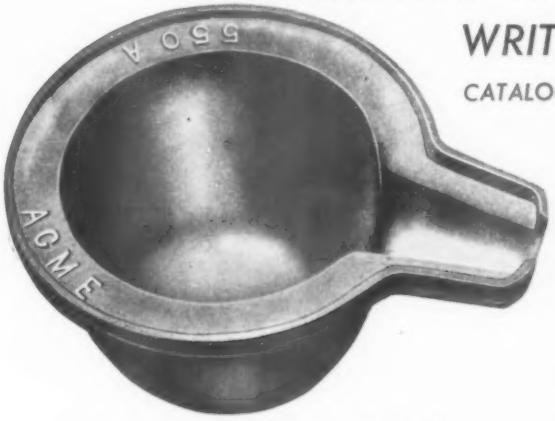
NICKEL ALLOYS: International Nickel Co. Inc., 67 Wall St., New York 5—Revised, 32-page booklet, "Nickel Alloys in Railway Equipment," contains illustrations and data describing the uses of stainless steels, alloy steels, alloy cast irons and bronzes, and other alloys containing nickel in the development of modern rail transportation.

REFRACTORY COATING: Whitman Co., 1407 Esperanza St., Los Angeles 23—Precipitating, self-vitrifying refractory preservative designed for use on high temperature furnaces, fire boxes and crucibles is described in leaflet. Another coating designed for use in iron cupolas and ladles also is described.

HUMIDITY CONTROL: Surface Combustion Corp., 2375 Dorr St., P.O. Box 907, Toledo 1, O.—8-page booklet explains the principle of selective humidity control for industrial processing applications. Numerous installations are illustrated.

MELTING POTS—Ingot Molds

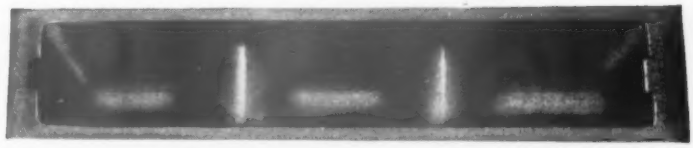
for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.



ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

WRITE for
CATALOG "F"

HOLDING——→
BOWL NO. HP7001



INGOT MOLD NO. AA-6

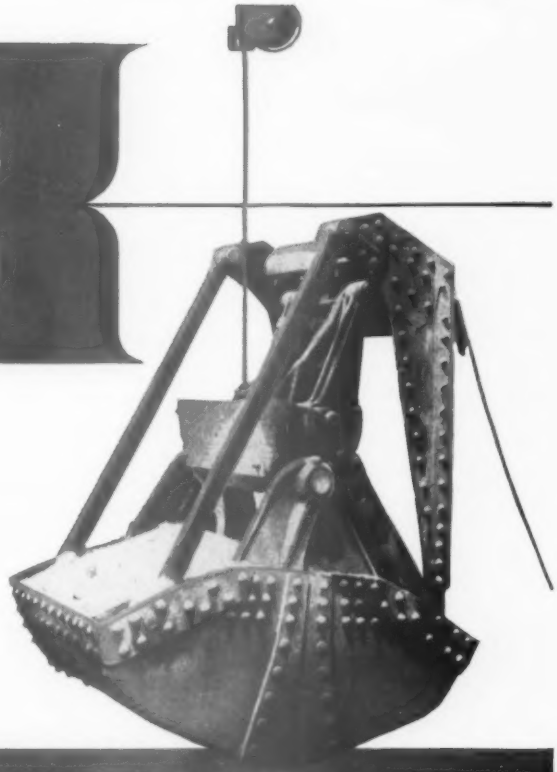
Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

ACME FOUNDRY COMPANY

DETROIT 16, MICHIGAN

2502 TWENTY-SECOND ST. PHONE TASHMOO 5-2404

JUST 6 FEET 7 INCHES OPERATING HEADROOM



You may not require a bucket of such extremely low headroom, but if you do, Blaw-Knox makes it. It's just one of many designs particularly suited to foundry conditions which are illustrated and fully described in *Catalog 2002*. Your request will bring a copy by return mail.

BLAW-KNOX DIVISION
of Blaw-Knox Company
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BLAW-KNOX CLAMSHELL BUCKETS

★ Sharper Castings
★ Greater Brinell Hardness
★ Increase Tensile Strength
★ Increase Transverse Strength
★ Increase Wear Resistance
★ Increase Heat Resistance

Copper Shot

IMPROVES YOUR IRON

ALTER COMPANY Fifty Years of Service
1702 Rockingham Road, Davenport, Iowa

OVER 8,000
Bosworth
MOTO-TRIMMERS & CONVEYALLS
ARE BEING USED PROFITABLY AND SUCCESSFULLY IN CONVEYING AND LOADING APPLICATIONS!

HANDLES ANYTHING FROM 300 MESH MATERIAL TO LUMP SIZE COAL

A MODEL FOR EVERY CONVEYING PURPOSE

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Bosworth Products are the "right hand" of progressive industry. Sturdy, speedy and safe, they pay for themselves. Special sizes and lengths can be furnished.

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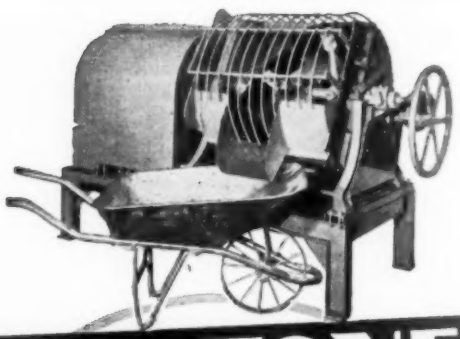


BLYSTONE
• MIXERS •

THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

FOUNDRY FAVORITE

The MOLINE No. 44 Heavy Duty Squeezer

Foundry men everywhere like Moline Squeezers, particularly the No. 44 Heavy Duty Portable, because they are fast, economical producers of high quality molds. The No. 44 consistently produces 285 molds per day with 12" x 16" flasks. It is especially designed for use in foundries requiring heavy duty portable machines to run over the sand pile. It will handle flasks 16" x 30" or under. Set-off benches are furnished at no extra cost.

There are four models of Moline Squeezers, designed in accordance with your specific requirements. It will pay you to write for complete details and descriptive folder.

WE SHIP QUICK!

MIW

MOLINE IRON WORKS
MOLINE, ILLINOIS, U. S. A.

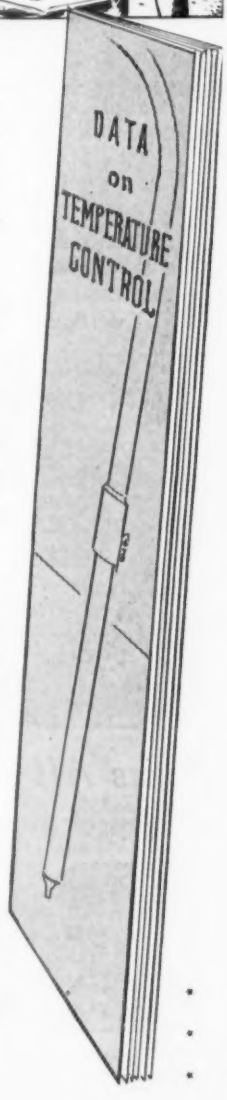
"ELIMINATE FAULTY CASTINGS!"

Porous castings, cold-shuts, misruns, and shrinkage are just a few of the causes of faulty castings! Nearly all of these can be eliminated by carefully checking pouring temperatures.

Here is the instrument to aid you: Marshall Enclosed-Tip Thermocouples! By use of these instruments, the foundryman can determine his molten metal temperatures quickly and easily. He can measure temperatures both in the furnace and at the instant of pouring.

By eliminating under-heating and over-heating, the reasons for most casting failures are done away with, and a sound, uniform product assured. L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio.

Send for the descriptive literature on Marshall Enclosed-Tip Thermocouples, and their place in the modern nonferrous foundry.



MARSHALL
THERMOCOUPLES

Cut Material Handling Costs with the "Chore Boy"!

Model B Chore Boy hauling castings in a Chicago foundry.

The BUDA Chore Boy offers foundrymen a proved method for cutting time and expense in bulk hauling operations. Having a remarkably low first cost, together with unusually low operating and maintenance costs, this gasoline engine powered "truck of a thousand uses" has paid for itself in a short time in rapid handling of rough castings, sand, slag, coke and coal, etc., for many foundries.

The Model B Chore Boy has a capacity of one-half ton, available with a spacious dump hopper with foolproof rocker and locking mechanism. The Model FF Chore Boy is a dual wheel unit offering a capacity of one ton for moving all types of material faster.

Buda Chore Boy unloading slag.

Runs All Day on a gallon of gas!

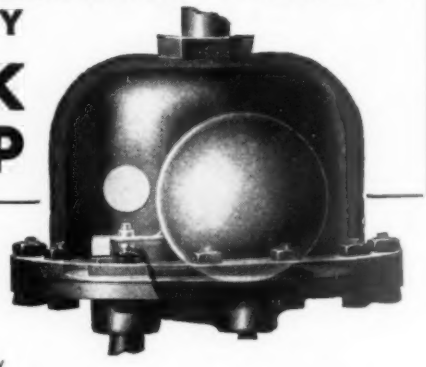
BUDA

15457 Commercial Avenue
HARVEY (Chicago Suburb) ILLINOIS

PREVENT* COMPRESSED AIR STORAGE TANK *EXPLOSIONS

DELIVER AIR CLEAN AND DRY . . . INSTALL A **MURPHY**

TANK TRAP



IT NEVER FORGETS

• Automatically removes all condensate (water and oil). Leakproof. Requires no attention, no maintenance. Install it . . . and forget it. Alternate inlets for cramped space installations. Ideal for garage, service station and similar installations. Priced within reach of the smallest compressed air user.

GUARANTEED to perform as advertised or money refunded.

Write for literature and price.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

THERE'S ROOM ALOFT

If ground is too limited to scatter materials all over the lot, there's room upwards for storage in Neff & Fry super-concrete stave silos. It's better anyway to store flowable bulk materials out of the weather.

The construction of Neff & Fry storage bins assures service for a generation or longer with virtually no upkeep expense. The super-concrete staves are dense, smooth, enduring. They interlock to form strong, tight joints. Each tier is bound with high-tension steel hoops.

Hundreds of N & F bins are in use for storing cement, chemicals, coal, fertilizer, grain, gravel, lime, sand, sawdust, seeds, water, wood pulp, and numerous other materials.

Would you like to have our catalog which tells the whole story? A copy is yours for the asking.

THE
NEFF & FRY
COMPANY
CAMDEN, OHIO

SUPER CONCRETE STAVE

NEFF & FRY STORAGE BINS

IT'S NEW—IT'S SENSATIONAL

AMASTEEL

GENUINE ALLOY STEEL
SHOT & GRIT

LASTS MANY TIMES LONGER

Here at last is peak efficiency in Shot and Grit for blast CLEANING and PEENING. AMASTEEL SHOT and GRIT are far better than ordinary hard iron abrasives because they are TRUE ALLOY STEEL.

Compared to regular blasting materials, AMASTEEL offers an amazing superiority due to its long life and resistance to breakdown and greater CLEANING and PEENING speed. This feature means additional savings on labor, handling, storage, freight costs, and dust disposal.

AMASTEEL is produced under exclusive patents and is available in sizes that meet all CLEANING and PEENING requirements.

Investigate AMASTEEL Shot and Grit today.

PRODUCERS OF
PEENBLAST
AND
CLEANBLAST

ALLOY METAL ABRASIVE CO.
311 WEST HURON ST. ANN ARBOR, MICH.

Announcing the New-

Morrison CORE OVEN

MORE PRODUCTION—with Uniformity . . . Speed
LESS COSTS—mean Fuel Savings...Space Savings

The new MORRISON standard Oven is designed for core-baking, mold-drying, and similar applications requiring maximum uniformity obtained by forced convection of heated air.

The MORRISON method of uniform heating by forced convection is also ideal for curing plastics, baking paint and enamel finishes, and other processing of materials up to 750° F.

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PLEASE SEND A MORRISON SPECIALIST TO SEE ME IMMEDIATELY.

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Want Perfect Pattern Contour for Your Castings?

BUCKEYE "3-IN-1" FLASK GUIDES

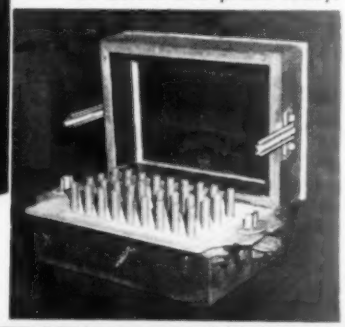
(Patented)

MAKE EVERY LIFT A PERFECT LIFT!

You get a true perpendicular lift every time — when you use Buckeye "Three-In-One" Flask Guides — no rocking or shifting of the cope is possible. No ruined molds.

For precision lifts, perfect pattern contour, lowered costs and stepped-up production, specify Buckeye "Three-In-One" Patented Flask Guides for all straight or tapered flasks. Furnished in 3, 4, 5, 6, 7 and 8" lengths. Write for full details and prices today!

Patented "3-in-1" Flask Guides prevent cope from shifting while being lifted from drag!



THE BUCKEYE PRODUCTS COMPANY

7029 VINE STREET, CINCINNATI 16, OHIO

Manufacturers of Core Oil • Parting • Core Compounds • Refractory Cements • Flask Fittings

FOX HIGH SPEED STAND GRINDERS

- **SIMPLICITY OF DESIGN**
- **RUGGED CONSTRUCTION**

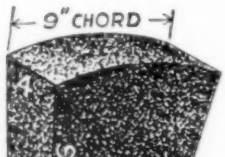
Featuring double ball-bearing construction and efficient single-wheel mounting.

Grinding wheel rotates on double bearings around a dead shaft anchored at both ends—completely eliminating all vibration and shaft whip . . . and the entire unit guaranteed for two years!

Have you the new Fox Catalog?

FOX GRINDERS, INC.

OLIVER BUILDING PITTSBURGH 22, PA.



6" Cupola Blocks and

6" Rotary Kiln Blocks

Dimensions of all Blocks

Outside Chord . . . . . 9"
Radial Dimensions . . . . . 6"
Thickness . . . . . 4"

Block Number	Inside Chord in Inches	Diameter in Inches		Number of Blocks to Circle
		Inside	Outside	
30-42	6 7/16	30	42	15
36-48	6 3/4	36	48	17
42-54	7	42	54	19
48-60	7 1/16	48	60	21
54-66	7 1/8	54	66	23
60-72	7 1/2	60	72	26
66-78	7 5/8	66	78	28
72-84	7 11/16	72	84	30
78-90	7 11/16	78	90	32
84-96	7 15/16	84	96	34
90-102	7 15/16	90	102	36
96-108	8	96	108	38
102-114	8 1/16	102	114	40
108-120	8 1/8	108	120	42
114-126	8 1/8	114	126	44
120-132	8 1/4	120	132	46
123-135	8 1/4	123	135	48

Cupola blocks standard and super quality. Refractory shapes, milled fire clay and cements.

THE DAVIS FIRE BRICK CO.

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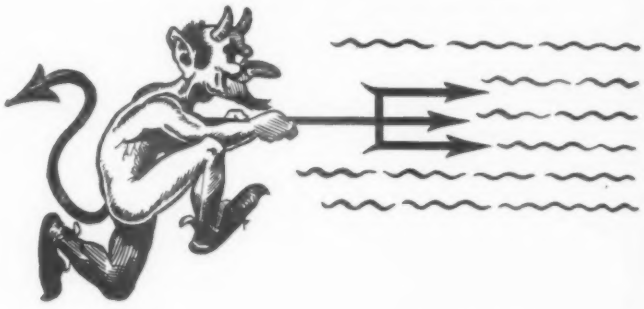
SOFFEL'S

THERMOTOMIC

METAL FEEDING COMPOUND

(PATENTS PENDING)

for Ferrous and Non-Ferrous Metals



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NOW WATERPROOFED—WILL NOT ABSORB MOISTURE EVEN IN GREEN SAND MOLDS

SOFFEL'S NEW WATERPROOF THERMOTOMIC COMPOUND is an exothermic material which produces a temperature of 3500° F. It can be molded and baked in any desired shapes just as sand cores are made. When dry, the THERMOTOMIC cores or inserts are highly resistant to moisture pick-up and may be placed in green sand molds many hours before pouring without absorbing moisture. THERMOTOMIC is used as ring inserts under the risers and feeding heads, where its exothermic action serves to raise the temperature of the feeding metal and prolong its fluidity, thus permitting adequate feeding while the casting cools and solidifies. In this manner, pipe and shrink cavities caused by premature freezing of the feeding metal are eliminated. THERMOTOMIC is also used as a facing or as facing inserts in the mold where it is desirable to maintain fluidity of the metal in order to prevent shrink cracks and segregation. After having burned out, THERMOTOMIC retains its original shape and becomes a refractory insulator. Because of reduced riser dimensions and the small feeding neck made possible by the use of THERMOTOMIC, tremendous savings may be realized through increased yield and reduced cleaning costs. Let us help you realize such savings in YOUR foundry.

SOFFEL'S NO. 5 LIQUIDIZER
For Ferrous and Non-Ferrous Metals

SOFFEL'S No. 5 LIQUIDIZER is an exothermic head compound designed to maintain fluidity of feeding metal in heads and risers. It is DIFFERENT from other head compounds on the market in that its action on molten metal is three-fold, whereas other types of head compounds perform only one function.

When stirred into the molten metal in heads and risers, No. 5 LIQUIDIZER reacts with itself exothermically, producing a temperature of about 3100° F. This heat actually raises the temperature of the feeding metal well above that of the metal in the main body of the casting. For best results and greatest savings, we recommend the use of No. 5 LIQUIDIZER in conjunction with THERMOTOMIC COMPOUND.

In addition to the exothermic action, No. 5 LIQUIDIZER also acts as a deoxidizer and will remove occluded gases, oxides, and dirt from the metal. Fluidity of the metal is greatly increased, and impurities are prevented from entering the casting. As a result, the metal will have better tensile strength and elongation.

A third function of No. 5 LIQUIDIZER lies in its insulating properties. After the exothermic action has ceased, the LIQUIDIZER forms a soft, red-hot insulating blanket on the metal which prevents loss of heat to the atmosphere by radiation. The heat generated by the LIQUIDIZER is confined to the heads and risers, further preventing solidification of the feeding metal.

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Pittsburgh Metals Purifying Corp.

"Fluxes and Purifiers for all Metals and Alloys"

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Try this blast cleaning abrasive and you'll see why repeat orders from America's leading foundries are gaining momentum—FAST.

Its quality is outstanding due to careful selection of materials and our Exclusive Heat Treating Process.

Right size for every cleaning job. Complete range of sizes accurately graded to S.A.E. specifications. Write for Samples and Prices.

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20th CENTURY BLAST · SHOT ★ GRIT ·

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Less Weight More Power

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They are manufactured in all types and sizes, and are arranged for manual or electrical operation.

Our line of pouring and handling equipment is complete, including bowls, shanks, bails and tongs . . . special equipment.

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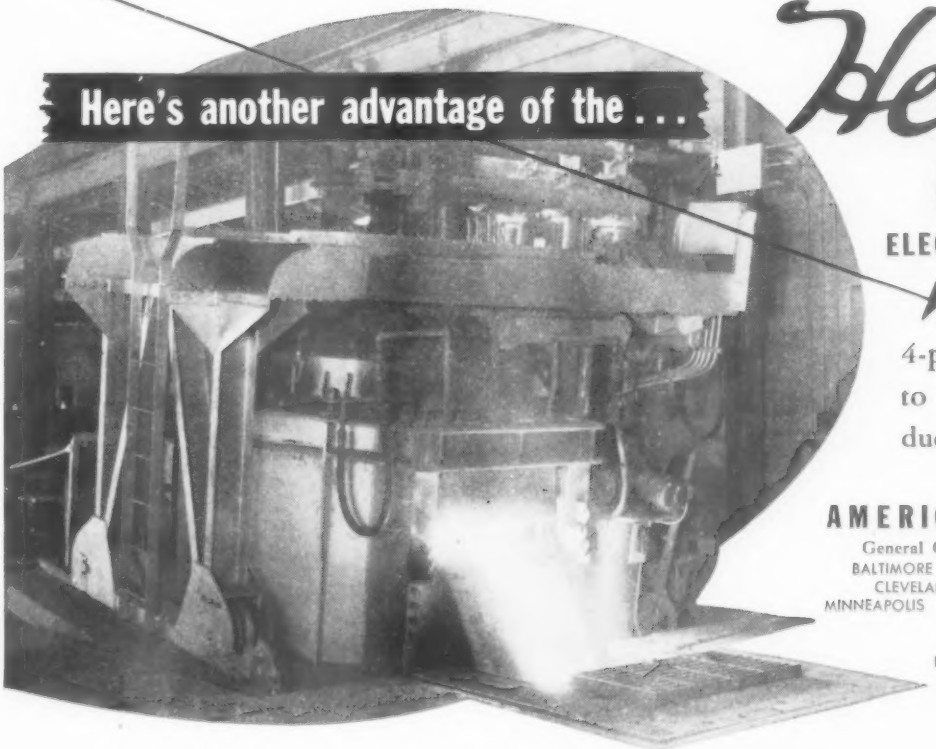

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SO—233

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Smooth-On No. 4 Foundry Cements are inexpensive and easy to use . . . harden like part of the casting metal . . . can be filed. Choice of 3 grades permits you to match the metal.

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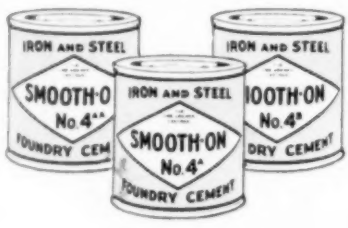

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If you have never used Smooth-On before, then try it at our expense. Fill out the coupon and mail for working sample of whatever shade you select, specimens of hardened Smooth-On, and 40-page Smooth-On Repair Handbook.

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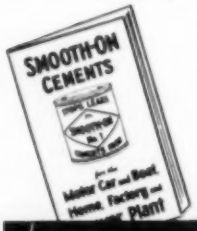

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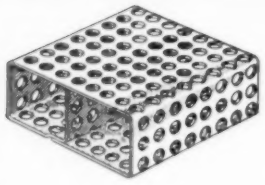

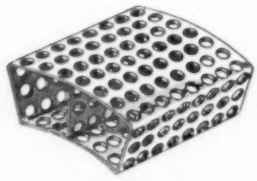

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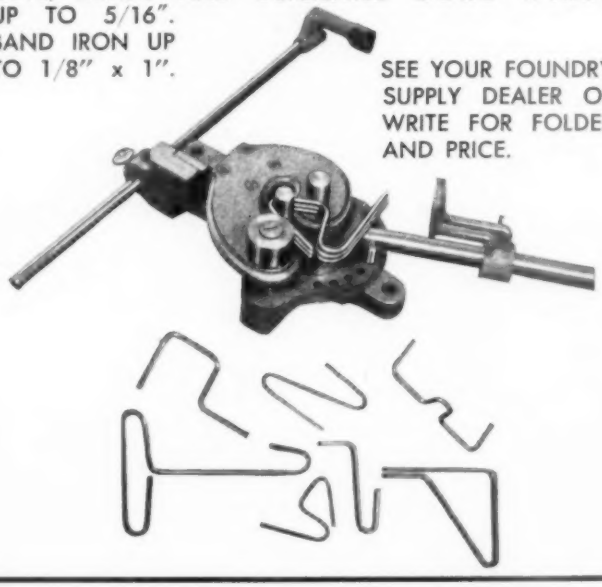

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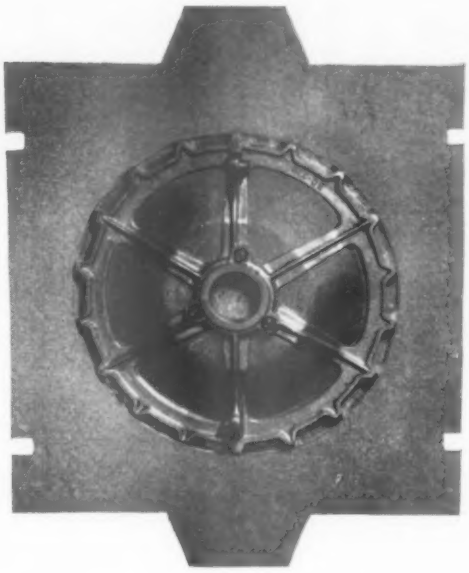

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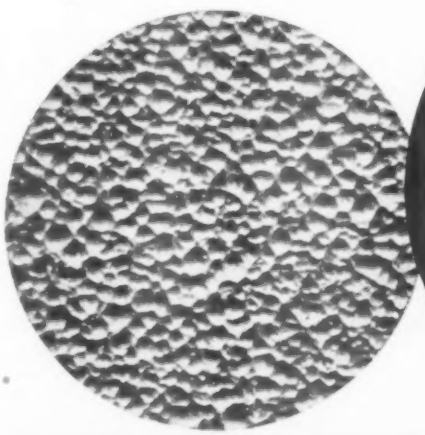
BECAUSE EVERY GRAIN IS A COMPLETE CUTTING TOOL



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1. Every grain is a complete homogeneous mass – no cleavage lines.

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All sizes graded to new S.A.E. specifications. Order "CERTIFIED".

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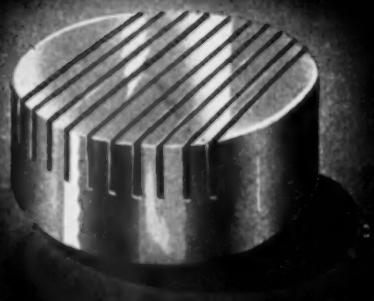

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BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

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NO. 4 DAYTON RING VALVE BENCH RAMMER

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Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

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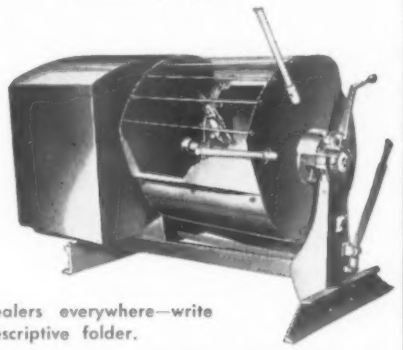

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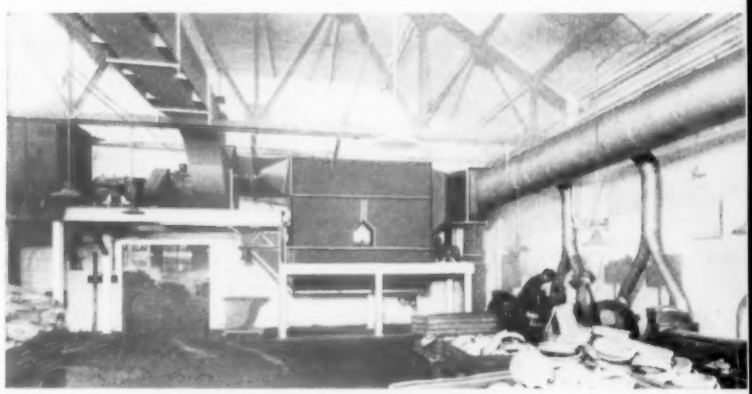
Let us show you the safe, thorough and economical job of elimination CENTRI-MERGE is doing *right now* in foundries similar to your own — *why* it will do the same for you.



CENTRI-MERGE Collection Units are available in capacities to handle any air cleaning job — small or large. May be installed singly or in batteries, depending upon volume of air to be handled.

THE *best* AIR PURGE *is* CENTRI MERGE

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For sawing tubing, small rods, sheet metals, gates, risers, compositions, woods, hard rubber.

High speed motor or with low speed geared head motor direct connected to lower wheel.

Cuts straight, circles and curves.

The finest Band Saw of its capacity ever built.

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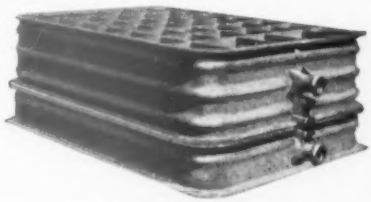

Model CH-40 Truscon Flask for Extra Heavy Duty.

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Truscon's Pressed Steel Division—nationally known for the quality of its products and the dependability of its service—is fully equipped and prepared to handle your foundry flask requirements. The Pressed Steel Division's central location assures efficient service for your needs. Write for free catalogs describing Truscon Steel Foundry Flasks.

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STEEL FOUNDRY FLASKS

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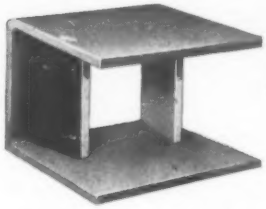
BUFFALO "Double Angle" CHAPLETS

★ Greater Strength
★ Burn in more easily
★ Less Chilling

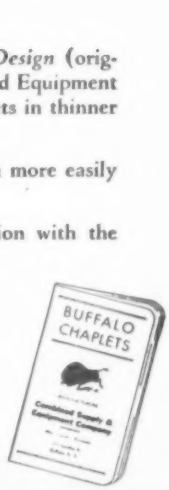


The extra strength of this exclusive *Angle Design* (originated and patented by Combined Supply and Equipment Co.) permits the use of these Buffalo Chaplets in thinner gauges.

Direct advantages are the ability to burn in more easily and a greater resistance to chilling.

Thorough coating promotes immediate fusion with the molten metal.

Your requirements may be met with Buffalo "Angle Stem" (Single) or "Double Angle" Chaplets, in a range of four metal gauges. Complete information, samples and prices promptly furnished.



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Contains useful data on complete line of chaplets

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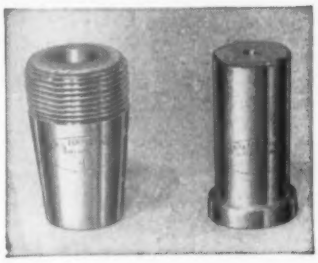
211 CHANDLER ST., BUFFALO 7, N. Y.

BLAST CLEANING NOZZLES

Saves AIR

Saves SHOT, GRIT SAND



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TUNGSTEN-CARBIDE

"The hardest material known to man." For this reason they outwear ordinary nozzles in use for sand blasting and metal cleaning by the blast method. Air consumption is reduced and the blast is *concentrated* because the hole in the nozzle wears very slowly. This means low cost operation.

TRY ONE AND SEE FOR YOURSELF—Made in all sizes and types: adapters furnished for all types of blast cleaning equipment.

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FOR DEPENDABILITY IN FOUNDRY PRODUCTION . . .

The UNITED Steel JACKET

Reinforcement Gusset
EXTRA STRENGTH

Cooling Vent
ELIMINATES WARPING

Sturdy Channel Construction
BUILT TO LAST

United steel jackets are designed and manufactured exclusively for foundrymen who demand a superior product for high production work . . . Unique channel construction assures extra strength and durability . . . New self-cooling double reinforcement at the parting line eliminates warping on runouts . . . All parts are electrically spot welded with additional arc welds at strategic points.

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Cleveland 13, Ohio

STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912 and March 3, 1933, of THE FOUNDRY, published Monthly at Cleveland, O., for Oct. 1, 1947. State of Ohio, county of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who, having been duly sworn according to law, deposes and says that he is the Business Manager of THE FOUNDRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Co., 1213 West Third St., Cleveland 13, Ohio. Editor, Frank G. Steinebach, 1213 West Third St., Cleveland 13, Ohio. Managing Editor, William G. Gude, 1213 West Third St., Cleveland 13, Ohio. Business Manager, Geo. O. Hays, 1213 West Third St., Cleveland 13, Ohio. 2.—That the owner is The Penton Publishing Company, Cleveland, Ohio. Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Edwin C. Barringer, Washington, D. C.; Samuel E. Bool, Cleveland, Ohio; Richard M. Bourne, Cleveland, Ohio; County National Bank of Santa Barbara, Santa Barbara, Calif.; J. R. Dawley, Cleveland, Ohio; Ernest C. Dempsey, Richard Inglis & Central National Bank of Cleveland as Trustees under agreement with John A. Penton dated Feb. 16, 1924, Cleveland, Ohio; The Fanner Manufacturing Co., Cleveland, Ohio; Agnes T. Hays, Cleveland, Ohio; George O. Hays, Cleveland, Ohio; Russell C. Jaenke, Cleveland, Ohio; S. H. Jasper, Pittsburgh, Pa.; A. L. Klingeman, Cleveland, Ohio; E. C. Kreutzberg, Washington, D. C.; Parness & Co., Cleveland, Ohio; J. D. Pease, Mount Dora, Florida; L. E. Penton, Los Angeles, Calif.; E. L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; E. L. Werner, Cleveland, Ohio; Grace Whelan, Santa Barbara, Calif. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4.—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me this 30th day of September, 1947. (Seal) R. W. Coleman. (My commission expires Dec. 26, 1947.)

HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card.

1. Grinder-Finisher

Hamilton Pump Co.—4-page illustrated bulletin "A Modern Process with Modern Results" describes grinding, finishing and polishing machine which features controlled cushion conditioning in finishing both sides of metal strip and sheet of all types and in all gages.

2. Polarographic Analysis

E. H. Sargent & Co.—6-page illustrated folder on polarographic analysis describes this method of analysis based on interpretation of current-voltage curves characteristic of a solution, when it is electrolyzed with the dropping mercury electrode. Equipment for use with system is covered.

3. Industrial Power Truck

Hyster Co.—16-page illustrated bulletin No. 1016D describes applications, operating advantages and features of Hyster 40 industrial lift truck which has pneumatic tires and handles loads weighing up to 4000 pounds. Lifting heights of up to 144 inches are obtainable. Power is provided by 25-horsepower gasoline engine which gives travel speed of up to 12 miles per hour in either direction.

4. Dust Collectors

American Wheelabrator & Equipment Corp.—16-page illustrated booklet entitled "Designed for Simplicity, Economy, Efficiency" presents ten outstanding reasons for the high efficiency and economical operation of American Dustube dust collector. Each feature is illustrated by graphic photograph or drawing.

5. Dry Type Transformers

Hevi Duty Electric Co.—4-page illustrated bulletin No. S-479 presents complete information on single-phase insulating type transformers, single-phase autotransformers and three-phase insulating type transformers for indoor distribution use. Dimensional data are included.

6. Pneumatic Hand Tools

Skilsaw, Inc.—22 x 28-inch broadside presents information on line of 28 models of Skiltool pneumatic powered hand tools which includes grinders, rotary files, drills, screwdrivers and nut runners, hammers and complete list of accessories.

7. Railroad Car Shakeout

Robins Conveyors Div., Hewitt-Robins Inc.—12-page illustrated bulletin No. 128-A describes railroad car shakeout for unloading hopper bottom cars in only few minutes and requiring only two men for operation. Reports of actual use in handling coal, petroleum coke, limestone, ore and other bulk materials are cited.

8. Pneumatic Tools

Reed Roller Bit Co.—24-page illustrated catalog No. 47 presents information on design, construction and use of pneumatic riveters, chipping hammers, rotary drills, rotary grinders, corner drills, sump pump and hose and fittings.

9. Industrial Equipment

R. C. Mahon Co.—12-page illustrated bulletin entitled "Mahon Finishing Equipment" includes plant views and descriptions of core and mold ovens, dust collecting equipment, sand storage bins, conveyor mold racks and core rack trucks, as well as wide variety of other standard and specially designed industrial equipment.

10. Small Cutting Tools

Severance Tool Industries, Inc.—28-page illustrated catalog No. 16 covers complete line of Midget mills as well as deburring tools, tube cutting tools, countersinks and miscellaneous cutters and tools. Prices are given on hundreds of shapes and sizes in wide variety of tooth styles. Regrinding service is described.

11. Core Blowing Machines

Wm. Demmler & Bros.—2-page illustrated bulletin describes No. 55 core blowing machine, points out its features and presents specifications. Only 4-inch pipe column air reservoir and one air connection are required.

12. Heaters & Thawers

Hauck Mfg. Co.—16-page illustrated catalog No. 1047 presents line of heaters and thawers to provide smokeless 2000 F flame and intense radiated heat for construction work, concrete mixers, central mixing plants, industrial plants, and other industrial operations.

13. Mounted Wheels

Carborundum Co.—32-page illustrated handbook entitled "Mounted Wheels and Related Abrasive Products" covers practical methods for increasing production, improving workmanship and reducing costs with light portable grinding equipment. Wide range of wheel shapes and sizes and variety of abrasives and coated abrasive disks, sleeves and cartridge rolls available for use are discussed.

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14. Fork Lift Truck

Crescent Truck Co.—6-page illustrated bulletin describes model LHVH Aisle Saver Palletier electric powered, compactly designed fork lift truck capable of stacking from 8-foot wide aisles.

15. Hydraulic Elevating Tables

LYON-Raymond Corp.—8-page illustrated bulletin No. 231 describes portable hydraulic elevating tables for die handling, strip and sheet feeding, work positioning, truck loading and other industrial jobs. Dimensional data and features of various models are set forth.

16. Industrial Air Compressors

Davey Compressor Co.—Illustrated leaflet describes new line of Air Chief industrial air compressors. Mechanical data and specifications on departmental units of 60, 105, 160, 210 and 315-foot per minute capacity units are given. Listed also are bare compressors suitable for installations with customers' motors or as replacement machines.

17. Cam Yoke Roller Bearing

McGill Mfg. Co.—4-page illustrated bulletin No. CY-47 presents data on Multiroll cam yoke roller bearings which provide increased adaptability of cam followers for all types of automatic machinery involving cam action or controlled motion of machine parts requiring guide or support rollers. Specifications and table of load capacities are included.

18. Safety Equipment

Safety Clothing & Equipment Co.—86-page illustrated catalog No. 50 presents information on complete line of Gardwell safety equipment and clothing for all industrial applications. In addition to clothing, helmets, hoods, face shields, machine guards and shields, acid handling equipment and other products are covered.

19. Shipping Containers

Dravo Corp.—12-page illustrated bulletin No. 220 describes 276-cubic foot capacity weathertight welded steel shipping containers developed to facilitate materials handling and to minimize pilferage losses during transportation.

20. Overhead Traveling Cranes

Euclid Crane & Hoist Co.—24-page illustrated catalog presents information on line of overhead traveling cranes in capacities of ½ to 25 tons and for spans from 20 to 100 feet. Detailed data on bridge girders, trolleys, brakes, drives and other features are given. Typical cranes are shown and complete table of specifications is included.

21. Motorized Hand Lift Trucks

Moto-Truc Co.—8-page illustrated bulletin No. 47-A presents details of complete line of platform, pallet, Hi-Lift and telescopic Hi-Lift trucks and industrial tractors with capacities from 2000 to 8000 pounds. Features and typical applications are shown.

22. Sand Dewatering Device

Link-Belt Co.—4-page illustrated folder No. 2263 describes Rotoscoop sand dewatering device capable of recovering available sand grains of sufficient fineness to meet specifications and discharging product dry enough to permit truck transportation or mechanical conveying to and from storage.

23. Cast Nickel Alloy

International Nickel Co.—36-page illustrated handbook entitled "Engineering Properties and Applications of Ni-Resist" gives detailed information on physical and mechanical properties of this cast nickel alloy. Performance under wide variety of industrial conditions involving corrosion, heat and wear is described. Corrosion data on 400 corrosive media are presented in tabular form.

24. Finishing Equipment

Despatch Oven Co.—16-page illustrated bulletin No. 51 contains case histories and shows typical units in line of finishing equipment which includes ovens, dryers, air heaters, spray booths, conveyors, metal cleaning and rustproofing units and air conditioning and makeup air systems for gas-oil, electric and steam power. Construction details and safety features are outlined.

25. Sand Moisture Meter

Harry W. Dietert Co.—4-page illustrated bulletin presents data on Moist-meter portable device for rapid determination of moisture content of sand on molding room floor or in sand system. Instantaneous result is indicated on direct reading meter face. Unit operates on electric resistance principle.

26. Refractory Coatings

Whitman Co.—4-page illustrated bulletin entitled "Two Tested and Proven Self-Vitrifying Refractory Coatings" describes features and applications of Vitroseal and Vitrobasic refractory coatings. Former material is used as preservative treatment for extending life of refractories and crucibles where acid conditions exist and latter material is for use in iron cupolas and ladles.

27. Electric Industrial Trucks

Electric Industrial Truck Assoc.—16-page illustrated booklet entitled "Looking Beyond the Price Tag" stresses importance of interpreting value of electric storage battery powered trucks, storage batteries and battery charging equipment in terms of dependability, handling speed, low operating cost, safety for workers and freedom from noise, fumes and odors.

28. Overhead Conveyors

Taylor & Gaskin, Inc.—Two illustrated bulletins present features and applications for Alltrack chainless overhead conveyors. One booklet contains typical application data and schematic diagrams. Second bulletin features installation of this equipment at Ford River Rouge plant.

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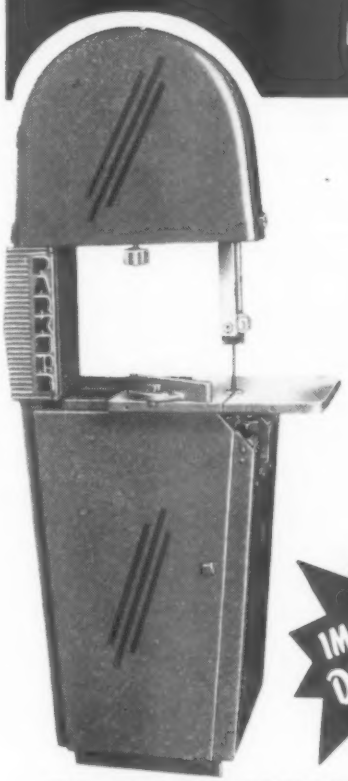
A Rugged Precision Pattern Shop Tool

The PARKS No. 2–18" BAND SAW



HERE is a modern, high-speed, heavy-duty band saw that has a place in every pattern shop. Designed for accuracy and high production, the Parks No. 2, 18" Band Saw is a sturdy, low-priced machine that meets the needs of every type of shop—large or small—and provides a maximum of performance, efficiency and economy of operation. Among its outstanding features are: Hard-Chrome-Plated Roller Guides; Light-Weight Aluminum Wheels; Heavy Weight, Heavy Duty Frame; Safety; 3500 ft.-per-minute cutting speed; and Heavy-Duty Ball Bearings. For complete specifications and details write for descriptive catalog sheet.

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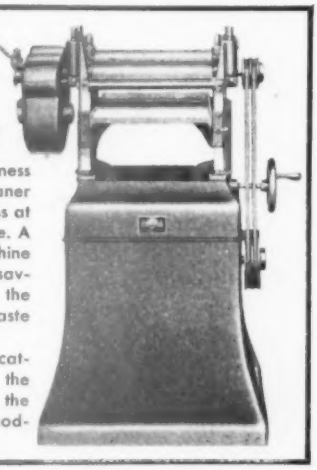
The PARKS Heavy-Duty 12"x4" Planer



A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. A real heavy-duty machine that will pay for itself in savings effected through the salvage of otherwise waste stock.

Write for descriptive catalog sheet on both the Parks 12" Planer and the sensationally new and modern Parks 20" Planer.

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Model AS

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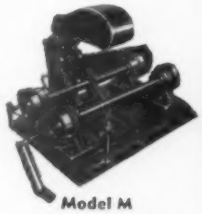
These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.

They are made in a large variety of styles and a wide range of sizes. Complete technical information is supplied concerning sand and permanent mold design, gating, sand mixes, speeds, etc.



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Send us drawings or sketches of parts you are interested in casting centrifugally, and we will tell you, without obligation, if and how our machines can cast them faster, cleaner and with fewer rejects.

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UNNECESSARY WHEEL WEAR IS
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THE STANDARD No. 35 GRINDER

The No. 35 has:

2 Independent Spindles.
2 7½ H.P. motors.
2 Magnetic Starters.
2 Start-Stop Push Button Stations.
2 Shaft Locks for use in changing wheels.
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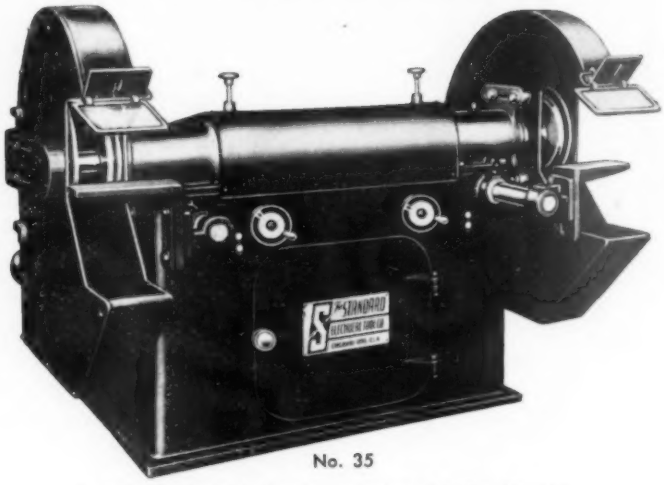
2 Interlocking Arrangements to prevent over-speeding of grinding wheels.

Arranged for 24" diameter resinoid bond wheels.



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Write for our Complete Catalog which describes "GRINDERS—all kinds!", from ½ H.P. to 30 H.P. Also a complete line of Disc Grinders. Long Distance phone Wabash 1677.

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MOLDS ARE BLACKENED FASTER
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Satisfactory Performance Guaranteed or Money Back!

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PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Used for Silica wash, oil, water or any liquid material. For sand-blast cleaning. As a blow gun for cleaning motors and machinery. If your dealer cannot supply you at once, order direct from manufacturer below. Literature on request.

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Moisture Elimination Up To 3000 Pounds Per Square Inch

CHEMICAL ANALYSIS OF
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The Improved PYRO Optical is the ideal instrument for Iron & Steel temperature measurements in the Foundry. Completely Self-Contained, Rugged, Direct Reading and Light-Weight (3½ lbs.).

The NEW PYRO Immersion (illustrated at the right) eliminates spoilage and insures uniform and sound non-ferrous castings. Bare Metal and Protected Type thermocouples instantly interchangeable.

Write for bulletins for full particulars

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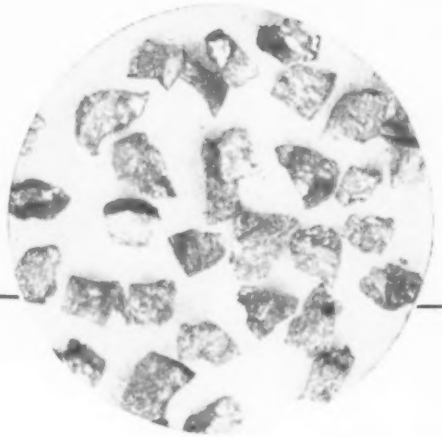

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★ LONGER DRESSER LIFE...

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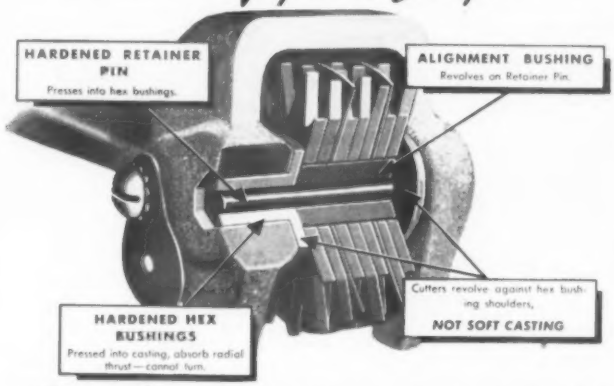
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Pressed into casting, absorb radial thrust — cannot turn.

Exclusive ON VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS

Vincent Dressers are built to *stand up* longer on snagging wheel and other tough dressing operations. All radial thrust and side friction is absorbed by hardened hexagon bushings . . . not soft casting of dresser. Dresser wear eliminated.

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A durable, colorful, coating for cement floors and surfaces.

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Solve your iron "puzzle" NOW! Write for a free sample. Test it yourself!

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*** Gives over a half ton of aerated, fluffed and properly conditioned sand per minute and eliminates the burdensome task of hand-shovelling the sand heap. THE BRUSH DOES THE JOB**

This *different* conditioner propels itself over the heap as thousands of tempered steel wires revolving at high speed pick up each particle of used sand, added bond and moisture and blend them thoroughly.

It breaks down the sand lumps, distributes the new sand and bond and moisture with the old sand, leaving the blended heap sand *light and fluffy.*

May we send further information and list of users?

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A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

A "blend" with JISCO is sound metallurgy.

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THE JACKSON IRON & STEEL *Company*

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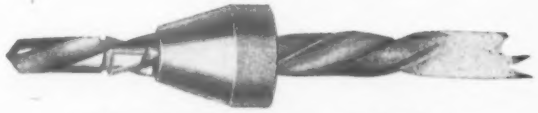

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HIGH CALCIUM FLUXING LIMESTONE

for use in
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Model H Jolt Squeeze

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10′ SQUEEZE CYLINDER

4″ JOLT CYLINDER

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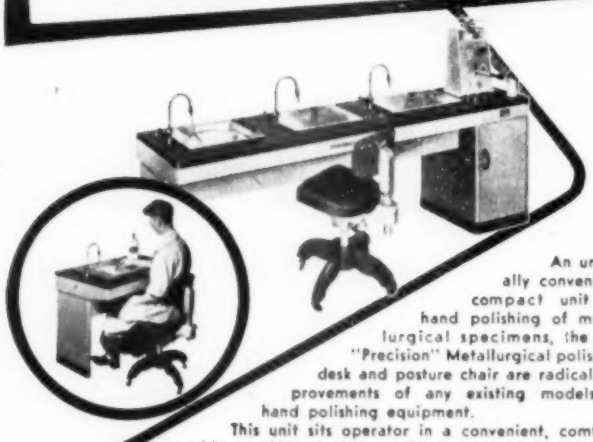
WHEN YOUR PROBLEM IS HAND POLISHING . . YOUR SOLUTION IS A "PRECISION" METALLURGICAL DESK



An unusually convenient, compact unit for hand polishing of metallurgical specimens, the New "Precision" Metallurgical polishing desk and posture chair are radical improvements of any existing models of hand polishing equipment.

This unit sits operator in a convenient, comfortable, working position. Eliminates working fatigue —promotes accuracy and efficiency, thus, delivers maximum production of polished specimens.

Cabinet space at right hand end of desk, contains shelves for convenient storage of laps and solution bottles. Deep stainless steel well surrounding lap, permits washing of laps without requiring separate sinks. Goose-neck faucet is standard equipment.

Available in one, two, three and four unit sizes. Write for Cat. 850-V.

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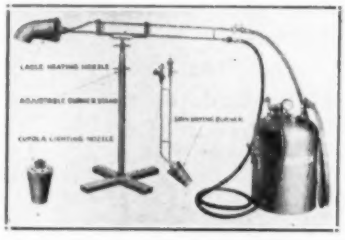

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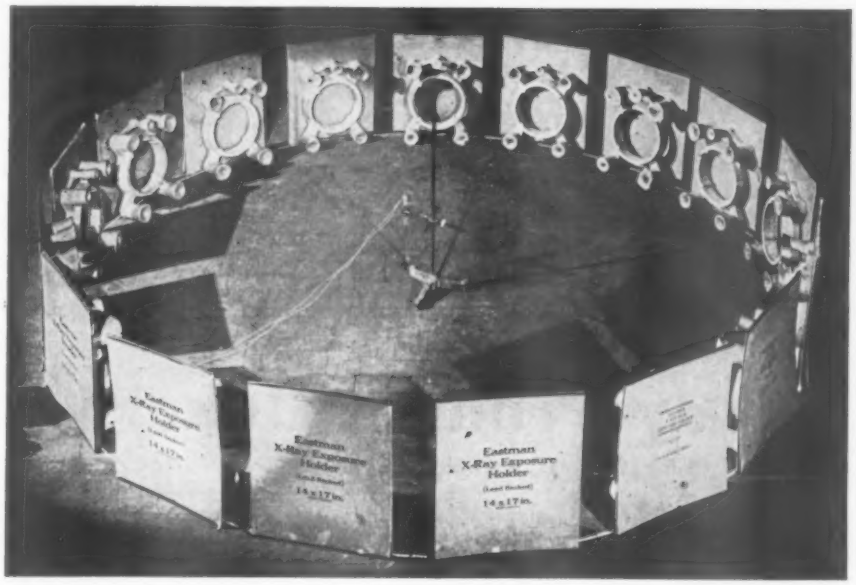

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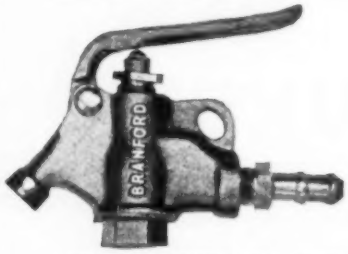

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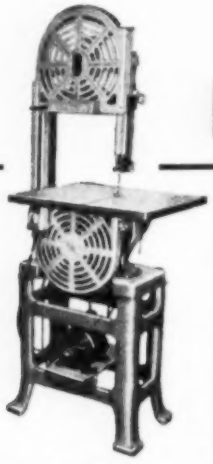

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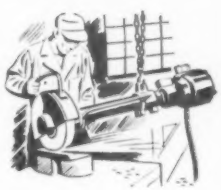

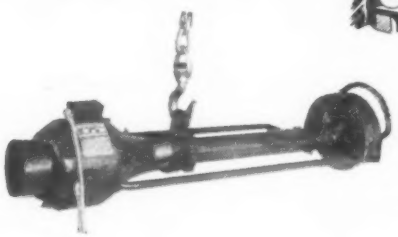

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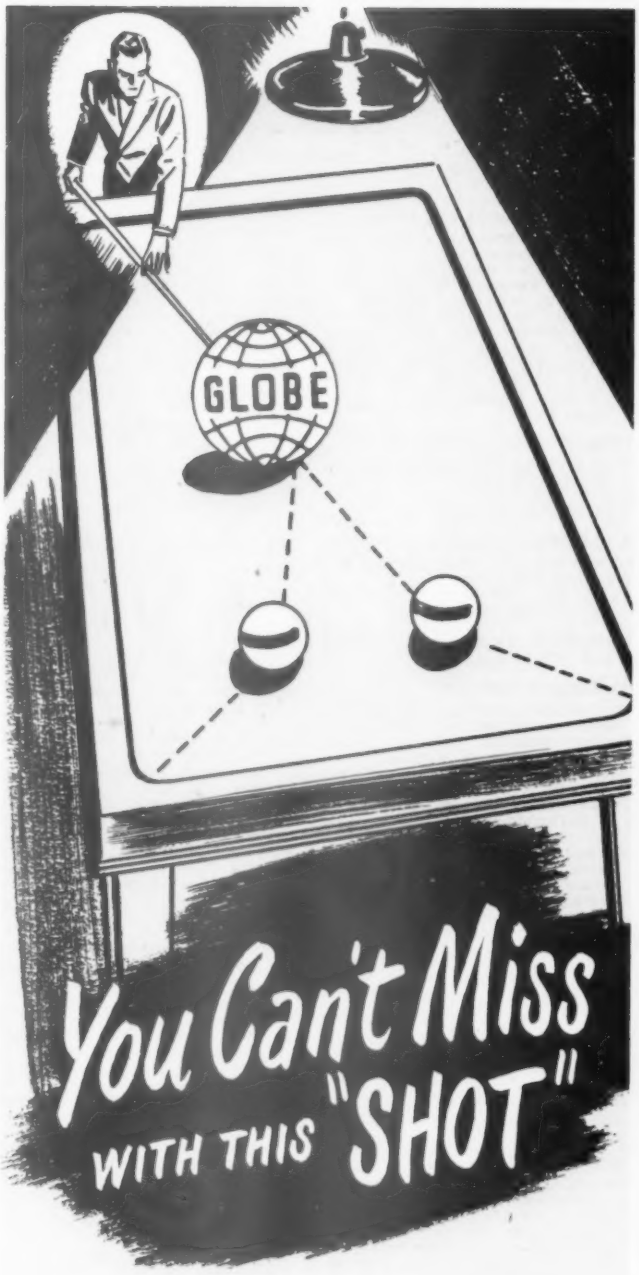

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Standard Horse Nail Corp., New Brighton, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHISELS (Chipping)

Dallett Co., 165 West Clearfield, Philadelphia, Pa.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.

CHROMIUM (Briquets)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

CLAMPS (Flask)

Diamond Clamp & Flask Co., Richmond, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Sterling Wheelbarrow Co., 1700 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

CLAMPS (Permanent Mold)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CLAY (Bonding)

American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Baroid Sales Division, 830 Ducommun St., Los Angeles 12, Calif.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Minco Products Corp., Saginaw, Mich.

CLAY (Refractory)

Carpenter Brothers, Inc., 606 West Wisconsin 3, Mo.
Eastern Clay Products Inc., Jackson, O.
Illinois Clay Products Co., Joliet, Ill.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati, Ohio.

CLAY STORAGE BINS

Neff & Fry, Camden, O.

CLEANERS, VACUUM (Portable, Stationary)

U. S. Hoffman Machinery Corp., 105 4th Ave., New York 17, N. Y.

CLEANING EQUIPMENT (Castings)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CLUTCHES (Magnetic)

Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwaukee 4, Wis.
Dings Magnetic Separator Co., 512 4740 W. McGeough, Milwaukee 7, Wis.

COAL (Anthracite)

Hudson Coal Co., Scranton, Pa.

COAL STORAGE BINS

Neff & Fry, Camden, O.

COKE (Foundry)

DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.
Semet-Solvay Co., 40 Rector St., New York 6, N. Y.

COKE (Petroleum)

Republic Coal and Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

COLLECTORS (Dust)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O. Co., 6201 Harvard Ave., Cleveland, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

COMBUSTION EQUIPMENT

North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

CONCRETE STORAGE BINS

Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)

American Air Filter Co., 223 Central Ave., Louisville, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVERTER BLOWERS

Roots-Connersville Blower Corp., Connersville, Ind.

CONVERTERS (Bessemer)

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVEYOR DESIGN

Giffels & Valet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

CONVEYORS (Apron)

Logan Co., 580 Cabel, Louisville, Ky.

CONVEYORS (Belt)

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CONVEYOR BELTS (Cont'd.)

Logan Co., 580 Cabel, Louisville, Ky.
Material Movement Industries, 310 So. Michigan Ave., Chicago 4, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Inc., 70 Pine St., New York 5, N. Y.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)

Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Gravity)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Live Roller)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)

Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

CONVEYORS (Monorail)

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 E. 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.

CONVEYORS (Overhead)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

CONVEYORS (Pneumatic)

Fuller Company, Catasauqua, Pa.

CONVEYORS (Portable)

Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Material Movement Industries, 310 S. Michigan Ave., Chicago 4, Ill.

CONVEYORS (Portable-Gas Electric)

Bosworth Engineering Co., 6723 Denison Ave., Cleveland, Ohio.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Material Movement Industries, 310 So. Michigan Ave., Chicago 4, Ill.

CONVEYORS (Rubber)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Syntron Company, Homer City, Pa.
Simplicity Engineering Co., Durand, Mich.

COPPER

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

COPPER SHOT

Alter Company, 1702 Rockingham Rd., Davenport, Iowa.
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Silverstein & Pinsof, Inc., 1720 N. Elston, Chicago 22, Ill.

CORE BINDERS

American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Certined Core Oil Div., Socony-Vacuum Oil Co., Inc., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
Chas. A. Krause Milling Co., S. 43rd & Burnham St., Milwaukee, Wis.
Robeson Process Co., 500 Fifth Ave., New York 18, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Swan-Finch Oil Corp., R. C. A. Bldg., West, New York 26, N. Y.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE BLOWING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Interstate Pattern & Machine Co., Rock Island, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

CORE BOX (Pins & Bushings)

Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

CORE BOXES

Diamond Clamp & Flask Co., Richmond, Ind.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

CORE BREAKERS

Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.

CORE COMPOUND

Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Paper Co., 220 E. 42nd St., New York 17, N. Y.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Swan-Finch Oil Corp., R. C. A. Bldg., West, New York 26, N. Y.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE DRAWING MACHINES

Freeman Supply Co., Toledo 5, O.
Newaygo Engineering Co., Newaygo, Mich.

CORE GRINDERS (Power Operated)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
D. J. Murray Mfg. Co., Wausau, Wis.
Wadsworth Equipment Co., Akron, Ohio.

CORE KNOCKOUT MACHINES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

CORE MAKING MACHINES

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.
Wadsworth Equipment Co., Akron, Ohio.

CORE OIL

Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.
Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Swan-Finch Oil Corp., R. C. A. Bldg., West, New York 26, N. Y.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE OVENS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit, Mich.
Foundry Equipment Co., Cleveland 13, O.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21, Mich.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Morrison Engineering Corp., 5005 Euclid Ave., Cleveland, Ohio.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

CORE PASTE

Corn Products Sales Co., 17 Battery Pl., New York 4, N. Y.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products Co., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE PLATES (Magnesium)

Christiansen Corp., 1 North LaSalle St., Chicago 2, Ill.

CORE PLATES (Steel, Asbestos)

Diamond Clamp & Flask Co., Richmond, Ind.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.
Wadsworth Equipment Co., Akron, Ohio.

CORE RODS

Bethlehem Steel Co., Bethlehem, Pa.

CORE ROD STRAIGHTENING and CUTTING MACHINERY

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.

CORE SAND

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Industrial Silica Corp., Stambaugh Bldg., Youngstown, O.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

CORE SAND MIXERS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

CORE SPRAYERS

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

CORE TRAYS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Wadsworth Equipment Co., Akron, Ohio.

CORE TRUCKS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

CORE VENTS

Demmler, Wm., & Bros., Kewanee, Ill.
PMS Co., 1701 Power Ave., Cleveland 14, O.
Smillie, C. M., & Co., 1100 Woodward Hghts Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N .Y.

CORE WASH

Asbury Graphite Mills, Asbury, N. J.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Stevens, Frederic B., Inc., Detroit 26, Mich.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

CORE WIRE CUTTERS

Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

CORE WIRE STRAIGHTENERS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st., Cleveland 5, O.

COREMAKERS
Coremakers, Inc., 4435 West Division St., Chicago 51, Ill.
Wadsworth Equipment Co., Akron, Ohio.

CORES (Annealing)
Pressed Steel Co., Wilkes-Barre, Pa.

CORES (Commercial)
Coremakers, Inc., 4435 West Division St., Chicago 51, Ill.

COUPLINGS (Flexible)
Ajax Flexible Coupling Co., Westfield, N. Y.

CRANE LUBRICATING SYSTEMS
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Bucket)
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Electric Tramrail)
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

CRANES (Electric Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Illinois
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Traveling)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 3960 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

CRANES (Monorail) (Cont'd.)
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Illinois
Modern Equipment Co., Port Washington, Wis.
Northern Engineering Works, 2615 Atwater, Detroit 7, Mich.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-Propelled)
Hughes-Keenan Co., Mansfield, Ohio

CRUCIBLES
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
National Crucible Co., Mermaid Lane and Queen Sts., Philadelphia 18, Pa.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES
Ajax Electrothermic Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.

CRUCIBLE LIFTERS
Modern Equipment Co., Port Washington, Wis.

CRUCIBLE POURING DEVICES
Modern Equipment Co., Port Washington, Wis.

CRUSHERS (Core)
Simplicity Engineering Co., Durand, Mich.

CUPOLAS
Modern Equipment Co., Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT
Carman, Edwin S., Lee Rd., at Mayfield, Cleveland 18, O.
Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LININGS
Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.
Ironton Fire Brick Co., Ironton, O.
Robinson Clay Products Co., 1100 Second National Bldg., Akron, Ohio.
United States Graphite Co., Saginaw, Mich.

CUPOLA SPARK ARRESTORS
Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Chicago, Ill.

CUTOFF MACHINES (Abrasive)
Clipper Mfg. Co., 2800 Warwick St., Kansas City 8, Mo.
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Wadsworth Equipment Co., Akron, Ohio.

DARK ROOM ACCESSORIES (X-Ray)
Eastman Kodak Co., Rochester, N. Y.

DARK ROOM PROCESSING (Chemical Tanks, etc.)
Eastman Kodak Co., Rochester, N. Y.

DEGASIFIERS
Foundry Services, Inc., 280 Madison Ave., New York 16, N. Y.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

DEOXIDIZERS
Alter Company, 1702 Rockingham Rd., Davenport, Iowa.
Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
American Smelting & Refining Co., 120 Broadway, New York 5.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

DEOXIDIZERS (Ferrous)
Carborundum Co., Perth Amboy, N. J.

DESULPHURIZERS
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.
Modern Equipment Co., Port Washington, Wis.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DIE CASTING MACHINES
Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio.
Miller-Taylor Tool Co., 5005 Euclid Ave., Clevelad 3, Ohio.

DIES
Acme Aluminum Alloys Inc., 232 North Findlay St., Dayton 3, Ohio.
Alumicast Corp., 1515 No. Kilpatrick, Chicago 51, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

DIRECT FIRED HEATERS
Dravo Corp., Neville Island, Pittsburgh 25, Pa.

DOWEL PINS
Standard Horse Nail Corp., New Brighton, Pa.
Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

DRILLS (Electric)
Standard Electrical Tool Co., 2488 Riverside Ave., Cincinnati 4, Ohio.

DRILLS (Pneumatic)
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Schramm Inc., West Chester, Pa.

DRIVES (Reciprocating)
Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)
Dings Magnetic Separator Co., 4720 W. McGeough, Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

DUMP HOPPERS
Buda Company, Harvey, Ill.
Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

DUMP TRUCKS
Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa.

DUST ARRESTING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS
Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.
Schmieg Industries, 6560 Cass Ave., Detroit 2, Mich.

DUST COLLECTORS (Shake-out)
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.

DUST RECOVERY SYSTEMS
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

DUST REMOVAL SYSTEMS
U. S. Hoffman Machinery Corp., 105 4th Ave., New York 17, N. Y.

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American Smelting & Refining Co., 120 Broadway, New York 5.
Apex Smelting Co., Chicago, Ill.
Christiansen Corp., 1 North LaSalle St., Chicago 2, Ill.
Cleveland Electro Metals Co., W. 38th St. & NP RR. Cleveland 13, O.
Federated Metals Div., American Smelting & Ref. Co., New York 5.
General Smelting Co., Philadelphia, Pa.
International Nickel Co., Inc., 67 Wall St., New York City 5.

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Lavin & Sons, R., Inc., Chicago, Ill.
National Smelting Co., Cleveland, O.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.
Silverstein & Pinsof, Inc., 1720 N. Elston, Chicago 22, Ill.
U. S. Metals Refining Co., New York.
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Fremont Flask Co., Fremont, O.
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LATHE CENTERS

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American Smelting & Refining Co., 120 Broadway, New York 5.

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Apex Smelting Co., 2534 Filmore St., Chicago 12, Ill.

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MAGNETS

Dings Magnetic Separator Co., 4740 W. McGeough, Milwaukee 7, Wis.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio.
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Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Pressure Cast Products Co., 1028 Vermont Ave., Detroit 16, Mich.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Wadsworth Equipment Co., Akron, Ohio.

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Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
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Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
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MODELS (Wood)

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Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
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Despatch Oven Co., Minneapolis 14, Minn.
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International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
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Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

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Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BENDERS
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE BRUSHES
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CUTTERS
Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE MACHINERY
Economy Tool & Machine Co., Muskegon 23, Mich.

WIRE NAILS
Republic Steel Corp., Cleveland 4, O.

WOODWORKING MACHINERY
Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.
Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati 23, Ohio.

X-RAY EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.

X-RAY INSPECTION SERVICE
Auto Specialties Mfg. Co., St. Joseph, Mich.

ZINC
American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.

—When writing advertisers, please mention THE FOUNDRY—

Classified Advertising

Help Wanted

SALES ENGINEER

To travel U.S.A. Wanted by a leading electric melting furnace manufacturer. Metallurgical experience necessary, electrical experience desirable. Prefer young, aggressive man. Write stating training and references to:

B. W. SCHAFER
DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY
BAY CITY, MICH.

WANTED

LONG ESTABLISHED MALLEABLE IRON FOUNDRY SEEKING EXPERIENCED MAN. MUST KNOW MODERN FOUNDRY EQUIPMENT AND DUPLEXING. ENGINEERING BACKGROUND DESIRABLE. PERMANENT JOB WITH EXCELLENT PROSPECTS FOR MAN ABLE TO ASSUME EXECUTIVE RESPONSIBILITIES. ALL REPLIES WILL BE HELD STRICTLY CONFIDENTIAL. ADDRESS: BOX 678, The FOUNDRY, CLEVELAND 13, OHIO.

WORKS MANAGER

Medium sized grey iron production foundry and machine shop employing 300 men, needs overall plant manager with engineering background to take complete charge of all operations. Opportunity for qualified man. Submit experience, age and salary desired. Address: Box 607, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Grey iron and semi-steel foundry now being mechanized desires to employ metallurgist to handle cupola and sand controls and such other work as is customary. Prefer young man with some experience in mechanized foundry. Permanent position. South-Central Pennsylvania location. Address: Box 403, The FOUNDRY, Cleveland 13, Ohio.

SALES ENGINEER

Must be thoroughly familiar with Foundry Equipment—particularly core and mold ovens, and dust collectors and dust control systems in foundries. Address: R. C. Mahon Company, Detroit 11, Michigan.

ASSISTANT FOREMAN

Assistant foreman in a new, modern gray iron foundry. Fully mechanized—all squeezer work. Must be capable of supervising 18 molders, coremakers and pouring. Plant located in Kentucky. State age, experience and salary expected. Address: Box 494, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
FOR
GRAY IRON JOB SHOP

Foundry pours 15 tons daily, up to 5 ton castings. Man must be aggressive, able to handle men, be responsible for all departments, know sand and be able to get production. Top salary to the right man. Foundry located in N. E. Ohio district. Address: Box 659, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT METALLURGIST

Long established and successful company operating gray iron and brass foundry in New York state desires an assistant metallurgist on cupola and sand control work. Excellent assignment for a young man with some foundry experience to secure permanent employment with opportunity for advancement. Address: Box 604, The FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER

Industrial engineer with foundry experience to establish wage incentive programs. Experience motion studies, work flow and operational analysis an advantage. Must be free to travel. Give training, experience, age, references and salary required. Address: Box 668, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

WANTED

GENERAL SUPERINTENDENT

MALLEABLE IRON FOUNDRY

Small malleable iron foundry in Central New York has opening for man with administrative and supervisory ability preferably with some technical experience in malleable iron. Write giving age, education, experience and salary desired.

FRAZER & JONES COMPANY
DIVISION OF
THE EASTERN MALLEABLE IRON COMPANY
SYRACUSE, N. Y.

STEEL CASTING SALESMAN

To call on trade in Chicago and surrounding area. Must be experienced in this field for approximately last five years. Salary—good opportunity—replies confidential. Address: Box 674, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Medium sized grey iron production foundry needs progressive man with technical background. Light and heavy castings modern plant. Good opportunity for qualified man. Submit experience and salary desired. Address: Box 608, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN OR ASSISTANT SUPERINTENDENT

Man with some experience on sand testing and cupola practice for a foundry in New Jersey area. Opportunity to qualify as foreman or assistant superintendent. State training, experience and compensation desired. Address: Box 687, The FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP FOREMAN

Excellent opportunity in Mid Western state for individual capable of supervising a department of approximately 20 employees. Should be familiar with both wood and metal patterns as well as gating practice in the malleable industry. Address: Box 639, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON
FOUNDRY FOREMAN

Several openings available for capable, qualified men with experience in supervising operations on molding lines, cleaning room or cupola. This is one of the largest, most progressive grey iron foundries in the country, highly mechanized—high speed production. Ample advancement opportunities and adequate compensation for the right persons. State in reply complete record of past experience, age and salary desired. Address: Box 680, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For grey iron foundry in Northern Ohio. Must be capable of taking complete charge of mechanized foundry employing 40 molders. Must be fully qualified in all phases of foundry practice. State age, experience, education, etc. in first letter. Address: Box 671, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

Twenty-five years' wide experience as superintendent in full charge of jobbing foundries making light to heavy high grade gray iron machinery castings. Well versed in modern production methods, rigging, cupola practice and handling men. Address: Box 684, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER FOREMAN

Supervisory position open for man with wood and metal supervisory experience. Must be fully qualified in all phases of patternmaking. Opening with progressive manufacturing organization located in Indiana. State complete work history, salary, etc, in first letter. Address: Box 537, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

MAINTENANCE ENGINEER

Must be a competent, well qualified administrative executive, capable of directing all supervisory personnel in all phases of maintenance work. Must be experienced in the design, installation and maintenance of all types of foundry equipment. Large Michigan production foundry.

BOX 675
THE FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SALESMAN

Experienced nonferrous salesman required by large Eastern foundry. Drawing account and commissions. Attractive proposition. Give full details. Address: Box 700, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER
OR
FOUNDRY MANAGER

Qualified in modernization, foundry practice, methods and procedure. Must be college graduate and willing to travel. Four to five years' experience. Age 30 to 45 years. Address: Box 676, The FOUNDRY, Cleveland 13, Ohio.

YOUNG FOUNDRYMAN

Excellent opportunity for ambitious young man to complete education in all phases of practical foundry operations. Time study experience helpful but not necessary. Must be free to travel. In reply give age, experience, references and salary expected. Address: Box 669, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

ELECTRIC MELTER

Available. Young, competent, progressive. Efficient, economical melting. References. Address: Box 696, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE. COOKING UTENSIL SPECIALIST OR ANYTHING YOU WANT MADE. FULL OR PART TIME. ADDRESS: BOX 667, THE FOUNDRY, CLEVELAND 13, OHIO.

PRODUCTION CONTROL

Young, married man with nine years' foundry experience. Last five years in charge of production planning in iron, steel and brass for large valve manufacturing concern. Have good knowledge of actual foundry practice. References. Address: Box 662, The FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD FOUNDRY SUPERINTENDENT

SEVENTEEN YEARS' EXPERIENCE; KNOWS ALL PHASES OF THE BUSINESS PERTAINING TO ALUMINUM CASTINGS. ADDRESS: BOX 664, THE FOUNDRY, CLEVELAND 13, OHIO.

FOUNDRY RESEARCH AND DEVELOPMENT

Would like to set up research and development department for foundry organization. Experience includes: foundry apprenticeship, sand and metal control, casting quality control, ferrous and nonferrous, time and motion study in foundries, research on metals and molding materials, precision castings, published technical papers, consulting foundry engineer.
ADDRESS: BOX 666, THE FOUNDRY, CLEVELAND 13, OHIO.

PATTERNSHOP

Part interest or take over your present patternshop and run your foundry or job shop as separate department. Twenty-five years' experience with wood metal patterns. First class mechanic on bench and working foreman. Address: Box 689, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

PATTERNMAKER

Experienced in wood, metal or plaster patterns. Capable of estimating costs and produce patterns, experimental or production work. Teach apprentice and handle journeymen to produce days' work. First class mechanic. Can layout and work on bench, wood and metal small shop as working foreman or supervise larger shop. Five years' molder, twenty-five years' patternmaker experience. Layout and make sand cast matchplates and core boxes complete with driers and core blowing equipment including master patterns, castings and metal work. Address: Box 690, The FOUNDRY, Cleveland 3, Ohio.

SUPERINTENDENT

Foundryman with nineteen years' experience as superintendent, foundry metallurgist and foreman in automobile, jobbing and malleable foundries desires position as superintendent or assistant in medium sized foundry in Northern Ohio, Michigan or Wisconsin. Wide experience in all branches of foundry work. Technical training. Best of references. Address: Box 694, The FOUNDRY, Cleveland 13, Ohio.

CORE ROOM SUPERINTENDENT

Experienced on blowing machines and all other kind of core making machines. Specialized in sand mixing, core making, assembling and core baking. Good health and ambitious with 25 years of experience. Address: Box 688, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Wants to make new connection. Capable, progressive and qualified to direct all foundry activities. Practical experience and technical knowledge. Broad experience producing quality castings. Light, medium and heavy-green and dry sand. Practical and well versed in cupola operation, metallurgy and mix iron by analysis. Cost minded, middle age and good personality. Address: Box 509, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN

Practical experience on steam valves, plumbing, hardware, ornamental bronze castings, jobbing and production work. Prefer position with manufacturing plant. Available about February 1, 1948. Address: Box 693, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Would like a formanship. Have had a number of years' experience both dry and green sand. Experienced on machines and bumpers. Can oversee core room. Address: Box 594, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SALES REPRESENTATIVE

Experienced foundryman desires connection with foundry producing quality ferrous castings. New York area. Address: Box 703, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

With broad experience in grey iron and steel casting wants position in metallurgical supervision, casting buying or selling or foundry supply sales. Technical background. Age 33, family. Address: Box 683, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT or ASSISTANT

Capable gray iron foundryman experienced in all departments of light to medium gray iron. Also experienced in steel molding. Reliable with A-1 references. Address: Box 497, The FOUNDRY, Cleveland 13, Ohio.

CONSULTANT

Available for pressure casting in both old and new industries. Also will soon be in position to supply proven pressure casting equipment. Address: Box 697, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC

Twenty years' experience in electric, open hearth, steel, malleable and grey iron mechanized foundries. Address: Box 705, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Desires connection with progressive foundry. Age 42, married, 23 years' practical experience in iron, steel and manganese. Eleven years in foundry supervision and management. Have training in Lincoln Extension Institute. Now have charge of large steel foundry in Mid-West casting steel and high alloys. Address: Box 670, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PLANT ENGINEER

Mechanical engineer with 25 years practical experience in highly mechanized foundry and allied manufacturing lines, including machine tools, tool design, enameling processes, furnace design, conveyors, plant layout and supervision of maintenance and personnel. Good references. Address: Box 695, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium size-company requiring reliable directing ability in management, sales, finance and production. Excellent experience machinery, tool, foundry and related lines. Address: Box 691, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-eight years' experience as foundry superintendent and practical molder. Understands cupola practice thoroughly. Technical education. Prefer position with foundry making high grade castings. Address: Box 619, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

With 20 years as assistant superintendent and superintendent on floor, pit and machine molding. Electric steel, open hearth steel and gray iron. Can furnish best of references. Address: Box 455, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Young aggressive foundryman wishes connection with reliable foundry. Sixteen years' experience iron and steel; sand control, metallurgy, heat treating and melting. Capable of taking complete charge of your operations. Cost minded. Now employed. Address: Box 623, The FOUNDRY, Cleveland 13, Ohio.

PATTERN ENGINEER

Thirty years' experience in designing and constructing wood, metal and composition patterns large and small for all classes of castings. Can solicit work and estimate cost from drawings and layout work. Make or supervise. First class mechanic with extended intimate foundry experience with magnesium and aluminum castings, machines, coreblowers, driers and gating. Address: Box 673, The FOUNDRY, Cleveland 13, Ohio.

AVAILABLE

Capable, progressive and qualified to direct all foundry activities. Practical experience and technical knowledge. Broad experience producing quality castings. Green, heavy green dry sand, loam and cement. Practical in cupola operation. Middle age. Address: Box 699, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

Wishes position as foreman or superintendent. Thirty-five years' experience as foreman and superintendent. Would consider change. References good. Available about January 1st. Address: Box 663, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER SUPERINTENDENT

Trouble shooter, pattern engineer, gray iron. McLain graduate. Experience in jobbing and production. Desires connection East. Address: Box 704, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thirty-two years' foundry experience. Twenty-five years as foundry superintendent. Capable of taking complete charge of all foundry operations, both ferrous and nonferrous. Good connection more important than a large salary. Address: Box 701, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Graduate, over 10 years experience in control, research, and development of wrought and cast steels, gray iron, and malleable. Desires position with progressive manufacturing concern or foundry. Address: Box 599, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM AND CORE ROOM FOREMAN

With side frame and bolster experience. Excellent opportunity with large foundry in Western Pennsylvania. Address: Box 567, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

SALARIED POSITIONS
$2,500-$25,000

This thoroughly organized confidential service of 37 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

Open Capacity

ANNOUNCING
CASTINGS
SERVICE
INC.

1534 Seventh Avenue, West
Birmingham 4, Alabama

IF IT'S CASTINGS YOU REQUIRE
MAIL YOUR INQUIRIES

This is a service organization staffed with experienced foundrymen, specializing in the placement and inspection of castings of all kinds for the account of the purchaser.

CASTINGS

Grey Iron
10 to 300 lbs.

FISHER & NORRIS
TRENTON, N. J.

OPEN CAPACITY

Squeezer, jobbing, rollover work in grey iron castings. Quality and prompt service assured. Prefer squeezer assignments from mid-west section near our Kansas plant. Address: Box 339, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Open capacity in grey iron foundry. Waterfronts—burners—bench, bumper and floor work. Address: P. O. Box 321, Belleville, Illinois.

OPEN CAPACITY

Have open capacity for aluminum castings on squeezer machines, also floor work. Address: FRANCIS MFG. CO., RUSSIA, OHIO.

OPEN CAPACITY

Aluminum foundry in Western New York. Castings up to 125 pounds, production or jobbing work. Address: Box 629, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Grey iron castings machine and floor #10 to 5000#. Address: P. O. Box 869, Joplin, Missouri.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Classified Advertising

Opportunities

BUSINESS OPPORTUNITY

Patternmaker wanted to start wood and metal pattern shop in Iron Mountain, Michigan to serve our new Iron Mountain foundry and its customers. Unusual business opportunity for patternmaker with initiative and vision. For full details write

GREDE FOUNDRIES, INC.
P. O. BOX 443,
MILWAUKEE 1, WISCONSIN

---

90 PER CENT OF THE CUPOLAS MELT UP TO ONLY 50 TO 60 PER CENT

capacity per hour—although the best and hottest iron is produced only when cupola is operated to its capacity. Report on your cupola may prove an eye-opener—usually the savings are surprising. Every pound of steel used in cupola mixtures reduces cost and increases strength 20 to 60%, because steel is purer than the most expensive pig iron. Watch the scrap pile—statistics prove casting losses can be held between 1 to 5% depending on the line of work. Our system is not an expense—but a valuable investment. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE, 12, WIS.

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Foundries for Sale

FOR SALE

The following well-organized and profitably operating plant is offered for sale on entirety basis as a going business.

STOVE MANUFACTURING PLANT

Alabama coal and iron area. Cupola capacity, 17 tons hourly. Ample supply fully trained native help. Buildings approximately 50,000 square feet.

Inquiries Invited

JOSEPH HAINES, JR. & SONS
JENKINTOWN, PENNSYLVANIA
Brokers in the Sale of Industrial Plants

FOR SALE

Grey iron jobbing and semi-production foundry now in operation with small connecting aluminum and brass foundry. Located in rapidly expanding industrial Southwest. Materials available and excellent labor and climatic conditions. Equipped with rollover, jolt squeeze machines, muller, wheelabrator and all necessary equipment. Excellent opportunity for future growth. Address: Box 692, The FOUNDRY, Cleveland 13, Ohio.

Foundries for Sale

FOUNDRY MACHINE SHOP

Locations

Investigate Advantages in

STURGEON BAY, WISCONSIN

Transportation by air-rail-water-truck
Dependable labor in
Progressive Community

Send for information to

STURGEON BAY DEVELOPMENT CORPORATION
BOX 424
STURGEON BAY, WISCONSIN

GREY IRON FOUNDRY FOR SALE

6-10 ton daily capacity, squeezer and cope and drag work. Room for expansion. Well equipped—all new machinery and metal flasks. Modern fire proof buildings. Six months' work scheduled at present capacity—repeat orders received each month to maintain schedule. C.P.A. audit available—will stand rigid investigation. Foundry operating efficiently—showing very high rate earnings—well staffed—pleasant labor relations—small town approximately 70 miles South and West of Detroit with railroad siding and good truck facilities. All present employees willing to stay. Non-active majority stockholder must sell all or part of holdings. A minimum of $15,000.00 required. Address: Box 682, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM AND BRONZE FOUNDRY

Medium size. Long established profitable business in eastern U. S. Modern buildings and equipment, low break even point. Capable organization and good labor conditions. Steady profitable business with substantial customers. Large backlog of orders. Owners retiring. Exceptional investment or expansion opportunity. Address: Box 655, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRY FOR SALE

Complete with pattern and machine shop. Going business with 27 years' successful operation. Ideal location in growing industrial section of Texas. Well established demand for product. Price $125,000. Terms. Address: Box 612, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Complete iron foundry, North Eastern Pennsylvania, 200 miles from New York City. Now doing about $30,000.00 a year business. Price $20,000.00. Address: Box 702, THE FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY

Located in fast growing Rocky Mountain area. Well established clientel with profitable year around business. Six months supply of pig iron and coke on hand and contracts for sufficient supply of both pig and coke. Present owners have other interests. Purchaser must be qualified producer of quality castings. Address: Box 679, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Medium sized foundry suitable for sand or permanent mold nonferrous castings. Cleveland district—good labor supply. Will sell all or part interest to person qualified. Address: Box 614, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE

Corporation desires to sell its grey iron production foundry near Kansas City. Good scrap iron market, ideal labor situation, taxes and utilities extremely low. Capacity 20 to 30 tons daily. 25,000 sq. ft. floor space, pouring room 185 ft. long, overhead conveyors, modern coreroom with automatic gas fired forced circulated oven. Wonderful bargain at $80,000.00. Will make elegant production unit for some company. Act quickly. Write or phone: F. L. Duclos, 1700 W. 49th St., Kansas City 2, Mo.

Foundries for Sale

FOR SALE

ELECTRIC ALLOY AND STEEL FOUNDRY

Three acres land, railroad siding. Located center Western Pennsylvania Steel District. One 6,000 lb. and one 1,500 lb. capacity electric furpaces. Cover type annealing furnace. All auxiliary equipment required for 100 tons per month. 15,000 sq. ft. steel and concrete block building, new in 1944. Principals only. Address all inquiries:

HERBERT DAVIS
P.O. BOX 469
ELLWOOD CITY, PA.

FOR SALE
FOUNDRY

Land, buildings, machinery, stock and equipment. Located in Providence. Established 50 years.

RICHARD F. RICHARDSON
804 TURKS HEAD BLDG.
PROVIDENCE, RHODE ISLAND

FOR SALE

Brass and aluminum foundry located in Northeast Ohio. Established trade. Capacity 5000 pounds daily melt. In operation for 30 years. Address: Box 698, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Well laid out nonferrous foundry in Central Indiana. 8500 sq. ft. floor space. Daily capacity 3 tons. Space available for expansion. Address: Box 672, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

Steel rod ¼" to ⅝"
Nails 6 to 20 penny

MURRAY M. NELSON, INC.
277 BROADWAY, NEW YORK, N. Y.

WANTED

4—42" x 66" or 72" Tumbling Mills with direct Motor drive.

CROWN PIPE & FOUNDRY CO., INC.
JACKSON, OHIO

WANTED TO BUY

1—15 HP, 16 oz. positive pressure blower with GE or Foxboro air weights controls for same.
1—15 HP air compressor, 90 lbs. pressure.
2—Small tilting oil furnaces complete for size #50 or #60 brass crucibles.
All above equipment must be first class.

BOX 686
The FOUNDRY **Cleveland 13, Ohio**

WANTED

100 sets—flasks close to this size: 25½-26 by 14" wide, 7½" cope; 6½" drag. Address: QUEEN CITY FOUNDRY & MACHINE CO., 391 NORFOLK AVENUE, BUFFALO, N. Y.

Classified Advertising

Wanted-To-Buy

WANTED

1—Curtis Air Hoist 14" cylinder dia. 5' lift. Address: P. O. Box 29, Ellwood City, Pa.

WANTED

One #3 Simpson sand mixer with motor.

THE DAYTON STEEL FOUNDRY COMPANY
P. O. BOX 1022 DAYTON 1, OHIO

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Detroit rocking furnace 300 to 700 lbs. capacity or induction furnace 100 to 300 lbs. in good condition with transformer and controls. Address: Box 520, The FOUNDRY, Cleveland 13, Ohio.

WANTED

One—Post jolt squeeze machine, International type PJS or similar with 12" or 13" diam. squeezing cylinder. Address: Box 616, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Pig Iron. Middle west foundry needs pig iron to be able to continue operations. We need 200 tons to complete 1947 schedules. Any amount will help. Prefer a malleable pig iron with silicon 2 to 3%. Address: Box 630, The FOUNDRY, Cleveland 13, Ohio.

WANTED

One Beardsley & Piper sandslinger ramming unit 250 volt 30 HP 1200 RPM 19" head 5" tip. Address: Box 677, The FOUNDRY, Cleveland 13, Ohio.

WANTED

One complete 7½ or 10 ton overhead crane, 60'0" span, for A.C. current, 220 volt, 3 phase, 60 cycle for inside service. Address: Box 600 The FOUNDRY, Cleveland 13, Ohio.

For Sale

CRAWLER TYPE CRANE

P. & H. model, No. 204, Waukesha Motor, Serial #2264, 35 ft. boom, ⅝ yd. Clamshell bucket. Crawler parts completely reconditioned last spring. $2700.00 spent in new parts only. Spare parts included with crane. Crane in operation at plant of

HOOSIER IRON WORKS
KOKOMO, INDIANA

STEEL FLASKS FOR SALE

89 sets 17" x 18"—10" cope, 7" drag with lifting handles. Good condition. Price $500.00 for lot. Address: G. & C. Foundry Co., W. Monroe & Olds Sts., Sandusky, Ohio.

FOR SALE

2—#521 Bellevue Aluminum Melting Furnaces
1—Beardsley & Piper #60 Speedmuller without motor.
2—Royer Sandblending Machines.
1—International Type R, Hand Ram, Hand Rollover Molding Machine.
1—Spencer Turbo Blower, 1350 C.F.M. at 32 oz. with 25 H.P., 1750 R.P.M., 220-440 Volt, 3 Phase, 60 Cycle, A.C. Motor.
10—Osborn 2" Air Vibrators
1—Simplicity Shakeout Screen 6'6" x 5'2" with 7½ H.P. 220-440 3 ph, 60 cyl Motor.

MARCH BROWNBACK CO., INC.
POTTSTOWN, PENNA.

FOR SALE

1 Pair 33" x 54"
Steel Exhaust Tumbling Barrels
Spur Gear Drive
Price, $250.00

THE SOUTHERN DESK COMPANY
HICKORY, N. C.

For Sale

FOR SALE

1—12" Thickness Planer, Parks #97, 2 HP single phase motor. New. Wood.
1—6"/Jointer—Sprunger Model A. Complete with stand and motor. New.
1—Dustkop Dust Collector with 1½ HP motor, 220/3/60. Two-way 4" flange, with 8 ft. 4" flexible metal hose. New.
1—Double-end emery grinder on pedestal with mounting for motor. Wheels up to 2" by 16". Good condition. $75.00.

Large quantity of wood flasks for jobbing work.

Assortment of wood snap flasks, straight and tapered, some nearly new.
18—Cast Iron Flask, 15" x 18", 5" cope & drag.
5—Steel Flask, 13" x 18", 4" cope and drag.
38—14" x 14" Steel Bands.
17—Adams jackets 15½" x 18½", 5" deep, tapered.
11—Steel Jackets, 14" x 18", tapered.
3—150# Ladles. 2-bales for same, and double-end ladle shanks.
1—1,000# Ladle and shank.
1—1500# Ladle and shank.

HILLSDALE FOUNDRY COMPANY,
HILLSDALE, MICHIGAN

FOR SALE 40 X 56 HERMAN
PNEUMATIC ROLL OVER MOLDING
MACHINE RO SERIAL NO. 175

40 x 50 Jolt Table Serial No. 1150

3000 lb Capacity

15" Diam Jolt Piston

Recently put in shape with new set 3000 lb pneumatic flask clamps, new air supply tanks for roll over cylinder and jolt cylinder, and new operating valve assembly complete.

Old machine in good condition, but just doesn't fit our work.

Price $1000 FOB our plant.

VERMONT FOUNDRIES, INC.
SPRINGFIELD, VERMONT

FOR SALE
USED FOUNDRY EQUIPMENT

Steel Tight Flasks
39—54 x 26 Drags 6"
41—54 x 26 Copes 12"
30—22 x 24 Cope 12" Drag 6"
26—18 x 30 Cope 12" Drag 6"
Eight Tabor Jolt Squeezer Machines with Vibrators.
Air Compressor—Gardner Denver
Size 9¾ x 7¾ x 5 450 CFM with 100 HP-1200 rpm 3 ph. 60 cy. 440 volt Motor
Hayward One Yard Electric Clamshell Bucket 230 Volt D.C.
62—1-7/32" High Speed 2 Flute Drills
75 Grinding Wheels 12" Diam. ½" Thick 1¼" Bore
16 Grinding Wheels 18" Diam. 1" Thick 6" Bore Steel Back Plate with 2½" Bore.

DONOVAN, INC.
1725 CARROLL AVE.
ST. PAUL 4, MINN.

FOR SALE

Whiting hydro-clone spark suppressor for #4 Whiting cupola. Has been kept painted and never been used. Will sacrifice for $1250.00, cost new $2500.00.

NUTMEG CRUCIBLE STEEL CO.
BRANFORD, CONN.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ⅝ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

For Sale

FOR SALE

1 Sand blast room, "Pangborn", mod. MT-S w/ 2'6" x 6'6" door, compl. w/ floor hopper, bucket type elevator, conveyor, abrasive separator, roto-active table, blast cleaning hose, dust collector, 10 hp, 3 hp & ½ hp mtrs. & control.
1 Sand blast cabinet "W. Sly" 8' W x 8' L x 7' H compl. w/ 6' turntable, mtrs., exhaust system & controls.
1 100 ton, 2 comp. storage bin, ¼ plate with one Comp. for 60 tons system sand and one Comp. for 40 tons, new sand. w/ 16 x 18 duplex gate.
1 Batch Hopper traveling, 12 x 12 gate with track & supports.
1 Screen, revolving "P. Bee" 4' dia. x 9' long drum incl. #HD8 speed reducer, less mtr., 7/16 dia. opening .135 wire.
5 Casting machines, centrifugal spinner type for bearings, compl. with 2 hp mtrs.
1 Chip extractor "DeLaval" compl. w/ 3 hp mtr.
1 Sand blast cabinet "Ruemelin" type AC compl. w/ cleaning generator—size 600 ser. #13577.
1 furnace, heat treat, salt bath-elec. "Upton Elec."—tank size 80" L x 44½" x 36½" H incl. transformer, 240 V to 18.4 V.
1 Furnace, heat treat—elec. "Elec. Furn. Co." 300 KW, compl.
1 Furnace, preheat continuous "Industrial Circ-Air" gas fired, 30" W x 12' L incl. 1 hp mtr. & blower (less burner, mtr. & cnts.)
1 Furnace, preheating "Industrial" gas fired 43½" W x 39½" D x 37½" H (less burners & door).
4 Furnace, melting — 1200# cap. "Hausfeld" Mag-Tilt, gas fired incl. burner (less lining).
3 Furnace, melting—pot type gas, 24" x 32" x 40" H overall less control.
1 Furnace, preheating oven type "American" #1 gas fired 8" D x 10" H x 14" L.
1 Oven, normalizing "Deway" recirc. radiant tube—gas.
6 Furnaces, box type annealing "Hoskins" mod. 252 elec. 2000° F. preheating compl. (less pyrometer).
1 Conveyor, roller w/ 3 x 18" rollers—(3) 6'-45" curved sections.
4 Core barrows—24" W x 48" L platform, three complete with pneu. tires.
2 Pump rotary—low pressure—2½" inlet, 2" discharge.
1 Blower, "Buffalo Forge" size 6.
1 Blower, "American Sirocco" size 7.
1 Pump, certrifugal 1½ w/ 5 hp mtr.
1 Dust collector, "Dust Kop" incl. filter and ¼ hp mtr.
1 Chip handling system complete with electric bucket elevator.
1 Hoist-Air, 3 ton "Ingersoll Rand", size D-6.
3 Hoists—Electric, 1 Ton "Detroit", type M5S. Trolley type with one 1½ HP motor.
1 Hoist-Electric, 2 ton "Detroit", type H complete with 3½ HP motor, 1½ HP travel motor and automatic reel.
1 Crane, 3 ton, 2 motor, bridge type "Detroit" model I.G.S., span 47' 10" with 3 ton hoist.
24 No. 250 long lip Tercod Crucibles, new.

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BUILDING
DETROIT 26, MICH.

FOR SALE

1 28"—8 Table Wheelabrator Tablast with Pangborn Dust Arrestor

3 #601 Osborn Jolt Rollover Machines

1 #602 Osborn Jolt Rollover Machine

2 12" Haynes Jolt Squeeze Machines

12 113-J Spo Jolt Squeeze Machines (New)

CROWN PIPE & FOUNDRY CO., INC.
JACKSON, OHIO

MOLDING MACHINE

One practically new 1942 model #918B Johnston and Jennings jolt rollover machine with brand new roll out table. Table size 44" by 54". Machine may be inspected at our plant. Price is reasonable. Address: WESTERN LAND ROLLER COMPANY, HASTINGS, NEBRASKA.

Classified Advertising

For Sale

FOR SALE

1—Wilbraham-Green cupola blower complete with base and 50 H.P. motor, 220 V., AC.
1—50 H.P. slip-ring motor, 3 P.H., 60 C., 220 V., 900 R.P.M.
3—Molding Machines
1—Norton floor grinder
2—Blowers
1—12" inside diameter by 7' 4" Whiting hoisting cylinder with piston.
1—Monarch electric box welder, 110 V

GREEN BAY SOAP COMPANY
GREEN BAY, WIS.

FOR SALE

Long established, successful, gray iron foundry, located on Niagara frontier. Owner wishes to retire.

BOX 558
THE FOUNDRY CLEVELAND 13, OHIO

TURBO BLOWERS

2100 cfm @ 10 oz. Spencer, with 10 HP, 220/440 V. 3/60/3600 RPM motor.
(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP, 220/440 V., 3 ph. 60 cycle 3600 RPM.

ALSO MANY PRESSURE BLOWERS NOT LISTED
HOISTS

¼ Ton—Detroit Titan—440/3/60
¼ Ton—Budgit—220/3/60
¼ Ton—Comet—440/3/60
¼ Ton—P & H—440/3/60
½ Ton—Chisholm Moore—440/3/60
½ Ton—Cleveland—440/3/60
2 Ton—Lo-Hed—220/3/60

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

1—96/61 Model "AA" American Sandcutter practically new, with less than five months' service.

6—Pioneer Rapid Jolt Molding Machines.

4—Osborn 75-J Jolt Molding Machines.

3—28" x 42" Tumbling Barrels.

WRITE OR PHONE

P. B. LAVELLE, P.O. BOX 798
ANDERSON, INDIANA

ROTARY BRASS MELTING FURNACE

Number 3 U. S. Rotary melting furnace, 1000 lbs. capacity, hinged charging door, new lining, with 3 phase 220 volts, rotating motor. Also attached, type L30-Fisher 300 C.F.M. 20 oz. 3 H.P. 3500 R.P.M. 220 volts motor and starting switch. Entire unit purchased October, 1945. Will melt 1000 lbs. in less than an hour. Guaranteed in best condition. Can be seen in operation any week day until December 15th. Price $950.00 F.O.B.

PRIER BRASS MANUFACTURING CO.
7719 EAST 15th ST. KANSAS CITY 3, MO.

FOR SALE

1—2 ton Pittsburgh Lectromelt Furnace size CQT complete with all controls, 2000 KVA transformer, 13800/115 volt ratio, four years old, used approximately five days. Can ship immediately. Address: Box 681, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

4—Int. Type R. J. power jolt hand R. O. & hand draw, boxes 14" wide—8" draw.
1—Tabor power jolt hand rollover machine, boxes 20" x 8".
4—International Type J.D.P. power jolt—power pin lift—table 24" x 36"; lift cap.—1600 lbs. Height 10 inches—adjustable pin centers to 27" x 37".
1—International Type J.D.P.—will handle flasks 48" x 48"—capacity 3000 lbs.—10" lift.

1—Tabor Cut-off Machine with 10 H.P., 220/440 Motor—like new.
2—Beardsley & Piper Screenarators—Model S.
1—New Belt for N.D.P. Royer.

1 American Wheelabrator 27" x 36" with 10 H.P. Westinghouse Motor, Complete with American Dust Collector 75 size, containing 10 H.P. Westinghouse Exhaust Fan and Motor, ¾ H.P. Motor in Dust Hopper.

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO.,
767 MILWAUKEE AVENUE
CHICAGO 22, ILLINOIS PHONE: CANAL 0314
NOT INC.

FOR SALE

1—Simplex, #94—Oil-Fired Furnace and Blower
1—Fisher, Type S 4-Burner Gas-Fired Furnace, $400.00 (NEW)
500 Transite Core Plates, .30" x 6" priced at $1.25 each
2—Kane & Roach Wire Straighteners, to take wire from ⅛" to ⅜"
1—Sand Blast Room (Pangborn) 13' x 13' x 10', complete with Pangborn Dust Collecting System, perfect condition, Priced at $2,000.00
Plus, a complete line of Conveyors, air compressors, and scales in stock at all times.
Send us your inquiries!

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD STREET
SHILLINGTON, READING, PA.

FOR SALE

One Detroit type AA, 1000 lb. cold metal charging capacity, 220/3/60 motor and controls, transformer 12000 volts primary, control panel. Good condition. No longer needed.

THE DURIRON CO., INC.
PUR. DEPT.
DAYTON 1, OHIO

---

8 EXHAUST FANS
NEW—UNUSED

120,000 CFM, Type "K" Buffalo Forge Mfgr. Capacity 120,000 CFM @ ½" S.P.
314 RPM at 110° F.

IRON & STEEL PRODUCTS, INC.
13444 S. BRAINARD AVE., CHICAGO 33, ILL.
"ANYTHING CONTAINING IRON OR STEEL"

FOR SALE

Johnson and Jennings jolt stripping plate molding machine No. 2, 30" x 36" table, 12" draw.

In good condition. Cost $1,000. Sell $525.00.

ENOT FOUNDRY COMPANY

WAYNE, MICHIGAN

REBUILT EQUIPMENT FOR SALE

AIR COMPRESSORS
1—4½ x 4½ with motor & tank.
1—Quincy 1¾ x 3 twin, complete with tank & 2 H motor, 1750 RPM, 3 phase, 440 volt, V belt drive motor. All mounted on base.
1—Ingersoll Rand No. 63832, Class E.R.2, Air cylinder 7 x 3½ x 5.
CORE OVENS
1—Half round with 5 shelves 51" high, 54" wide, 27" deep.
We also make new core ovens, any style or type desired—shelf, pull-out drawer or car type.
FURNACES
3—Fisher brass & aluminum, Type 3, complete with burner, new motor and blower.
GRINDING STANDS
1—Grinding stand, motor driven, direct drive, 2" to 20" wheels.
MIXERS
2—Blystone, motor drive with speed reducer.
LADLES
1—8 Ton worm gear.
1—5000 lb. worm gear.
We also make new ladles.
RIDDLES & RIDDLE BOTTOMS
20" Electric riddle bottoms.
18" Hand riddles, 5 ply.
SAND BLAST BARRELS
2—#4 Tilting Type.
SAND BLAST CABINETS
1—Type K 48" x 48" x 42" with dust arrestor, practically new.
SAND CUTTERS
1—Model AA Gasoline driven #68, rebuilt throughout.
1—48" American, electric.
SCALES
2—Toledo, new.
SPRUE CUTTERS
1—Sprue cutter with 2 H motor.
TUMBLING MILLS
1—30 x 36.
1—30 x 54.
1—44" dia. and 6'6" long equipped with an idler pulley-gear and shaft. Also has gear shaft for direct drive. This is in first class condition.
ARCADE MACHINES
1—Arcade rollover, air draw, air roll, air jolt, 32 x 48 table.
INTERNATIONAL MACHINES
3—Type R hand roll.
2—JS jolt squeezers.
7—Type JDP, power jolt, power pin lift.
2—Hand operated rollover, table 17 x 22.
CORE PLATES

7½ x 10	7½ x 18
7½ x 12	7½ x 20
7½ x 14	7½ x 22
7½ x 16	7½ x 24

These are in ¼" steel plate.
OSBORN MACHINES
1—560 Pin Lift.
4—J275 Jolt squeezers.
1—J276 Jolt squeezer.
6—JW275 Jolt squeezers.
1—J75 Jolt squeezer.
1—Jolt Squeeze Pin Lift.
OTHER JOLT SQUEEZER MACHINES
2—Milwaukee rebuilt Jolt squeezers.
4—Rapid, portable Jolt squeezers, new, only used 2 weeks.
STEEL FLASKS
40—sets, 12 x 31, 10 cope, 10 drag, $14.00 per set
50—sets, 11 x 41, 4 cope, 6 drag, 15.00 per set
30—sets, 12 x 31, 7 cope, 7 drag, 16.00 per set
30—sets, 18 x 19, 4½ cope, 4½ drag, 11.00 per set
40—sets, 18 round, 4 cope, 3 drag, 7.00 per set
25—sets, 13 x 35, 6 cope, 6 drag, 15.00 per set
MISCELLANEOUS EQUIPMENT
Hand Trucks, #792 Fairbanks.
6—Barrel Trucks, 2 wheel, rubber tires.
2—Type A-27-J Junior Model pneumatic tires, 600# capacity.
Core Trucks, 27 x 60 platform.
1—Automatic Lift Truck and Charger.
Lyon-Raymond Hyd. Lift Truck, 2500# cap. Model CW-11-54.
Air Bench Rammers.
Air Floor Rammers.
Air Grinders, portable.
Chipping Hammers.
Vibrators.
Branford shakeout vibrators.
Assortment of new emery wheels.
1—Scleroscope.
High speed motors and blowers for brass furnaces, several different sizes.
2000 ft. new ⅝" Air Hose.
1000 ft. new ¾" Air Hose.
Different sizes Roller Conveyor.
Aluminum shovel handles, with rubber inserts, 2 sizes, large and small, small for bench and squeezer, large for floor and machine.

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST.
KALAMAZOO 52, MICH.

Classified Advertising

For Sale

OVERHEAD CRANES

1-TON
Curtis 24' Span
Detroit 10' Span
Detroit 18'6" Span
Cleveland 38' Span
Euclid 40' Span
Shepard Niles 12' Span
2-TON
Conco 12' Span
Louden 19'2" Span
Northern 28' Span
P&H 31'10¾" Span
3-TON
Shaw 51'2" Span
Chicago Tramrail 27½' Span
P&H 37'6" Span
P&H 42'1½" Span
5-TON
Alliance 95' Span
Crane 47'3" Span
Crane 76' Span
Detroit 38'8" Span
Case 35' Span
Detroit 34' Span
Northern 32' Span
Northern 22' Span
P&H 31'10" Span
P&H 72'1" Span
Crane 37'3" Span
Crane 57'3" Span
Shepard 27'6" Span
6-TON
Shaw 21'10½" Span
7-TON
Charging & Quenching Cranes 32' & 36' Spans
7½-TON
Northern 26'7½" Span
8-TON
P&H 80' Span
10-TON
Lane 60' Span
Cleveland 51'3" Span
2 Yd. Morgan Bucket Crane 60' Span
Shaw 67'6" Span
P&H 87'6" Span
Shaw 80'9" Span
Alliance 58'5" Span
Lane 50' Span
15-TON
Overhead Crane 74'4" Span
Outdoor Crane 57'5½" Span
Alliance 48'9½" Span
New Albany 50'6" Span
Morgan 82' Span
Northern 76' Span
P&H 40' Span
Whiting 38' Span
20-TON
Overhead Crane 60' Span
Whiting 48'6" Span
Whiting 75' Span
Shepard Niles 48'6" Span
P&H 51'4" Span
P&H 37' Span
25-TON
Alliance 38'2" Span
Bedford 67'8" Span
Case 63' Span
Overhead Crane 74'4" Span
P&H 80' Span
30-TON
Morgan 55' Span
Northern 75' Span
35-TON
Overhead Crane 74'4" Span
40-TON
Niles 151'9½" Span
50-TON
Alliance 52' Span
Morgan 50' Span
75-TON
64'8¼" Span

Telephone us collect to discuss your requirements

ECONOMY COMPANY, INC.
49 Vanderbilt Avenue **New York 17, N. Y.**
Telephone: Murray Hill 4-1616

OVERHEAD ELECTRIC TRAVELING CRANES

QU	TONS	MAKE	SPAN	CURRENT
2	3	Shepard	18'0"	230-VDC
1	5*	Northern	14'0"	230-VDC
1	5*	Shaw Box	30'0"	230-VAC
1	5*	Northern	37'0"	230-VDC
1	25/5	Niles	80'0"	230-VDC

*LOWHEAD ROOM TYPE.

MONORAIL ELECTRIC HOISTS

QU	TONS	MAKE	CURRENT
2	¼	LoHed	230-VDC
6	½	Shepard	230-VDC
1	1	Shaw Box	220-VAC
1	1	Wright	118-VDC
1	1	Box	230-VDC
1	3	Shepard	230-VDC
1	3*	Shepard	230-VDC
3	3*	LoHed	230-VDC
3	5*	LoHed	230-VDC

*2 motor Fl. Op. Hoists we can supply them with cages.
3—¼ ton Yale stationary mounted hoists, 120-VDC, wrap 77' of ⅛" cable, 85-FPM., with 3-HP. motor (will furnish these arranged for 230-VDC)
ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.
SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKES & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

4—5000 lb. capacity 3 wheel buggy ladles with V tread roller bearing wheels, in perfect condition. Price $80.00 each.
1—Model NC-2 Royer sand separator and blender purchased new in July, 1946. In good condition. Price $400.00.

LAKE ERIE FOUNDRY CO., INC.
GIRARD, PA.

FOR SALE

1—Herman jolt rollover machine, size 42 x 30. Price..$500.00 complete with foundation plan.
1—Root cupola blower without meter, 50" impeller length, 15" diameter outlet. Price $400.00

JACKSON STREET FOUNDRY, INC.
EVERETT, MASSACHUSETTS

FOR SALE

Two hand power Moline molding machines. No. 2 and No. 3 portables in perfect condition, cheap. Two Red Devil electric vibrators. Address: C. I. Lee & Sons, Farley, Iowa.

FOR SALE

1—Adams universal jolt squeeze, side rod type, 12"-38".
1—No. 2 D. M. globe direct drive tumbling barrel, steel shell, motor included, 3 p.h., 60 cy. 220 volt.
2—Stationary furnaces No. 60, oil fired.
1—24 x 48 tumbling barrel.
2—32 x 32 x 48 Sly tumbling barrels.
Air compressors 105 cu/ft.

BOX 635
THE FOUNDRY **CLEVELAND 13, OHIO**

FOR SALE

LIQUIDATING SMALL GREY IRON FOUNDRY IN NORTHERN IDAHO. MAKE US AN OFFER ON ANY OF THE FOLLOWING EQUIPMENT:
3 Drawer type gas fired core ovens—any offer around $50.00 ea. takes these units
Patterns—mostly grate bar and street fittings
Wood flasks—all sizes fair condition
Model S screenarator—needs two new parts, will sell for an offer of $145.00
Ingersoll Rand one ton air hoist 4 yr. old fair condition ER-1 type. Value about $150.00
Floor rammer
1½ ton worm geared ladle and other smaller types pouring ladles
Arcade rollover jolt—fair condition—old style
2 pop off flasks 18 x 11½ x 6" cope and 3½" drag
One cherry snap same size
One 32" cupola and blower standard model value around $200.00
One 28" cupola and blower homemade model value about $75.00
One 21" cupola homemade value—$50.00

BOX 665
THE FOUNDRY **CLEVELAND 13, OHIO**

FOR SALE

Osborn Machine No. 275 J.P. Serial No. 8211 N.N. Portable Jolt Squeezer
Osborn Machine No. 275 J.P. Serial No. 8211 R.R. Stationary Jolt Squeezer
Osborn Machine No. 275 J.P. Serial No. 8211 A. A. Stationary Jolt Squeezer
Osborn Machine No. 274 J.P. Serial No. 7189-J Stationary Jolt Squeezer
Osborn Machine No. 175 Serial No. 950-7-C Portable Jolt Squeezer
Osborn Machine No. 275 P.J. Serial No. 8749-D Portable Jolt Squeezer
International, Serial No. 35065-2, Type 9-36JS-2 Portable Jolt Squeezer

M. MATLOW & SONS INC.
P. O. BOX 933
SYRACUSE, N. Y.

FOR SALE
STEARNS PORTABLE MAGNETIC SEPARATOR

With two magnetic pulleys 12" x 20" and 15" x 20" and two belt conveyors. Complete with motor generator set, winch and four rubber tired wheels. Ideal for foundry use.

MORSE BROTHERS MACHINERY COMPANY
2900 BROADWAY **DENVER 1, COLORADO**

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
1—#274 Osborn Plain Squeeze.
2—Tabor Plain Squeeze, Strain Rod Type.
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table.

BLOWERS FOR CUPOLAS AND FURNACES
6—#805 General Blowers, 5 H.P., 3/60/220, 1400 C.F.M. at 8-oz. pressure.
1—10 HP 1300 CFM 16 oz. No. American.
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
1—Style #600 Single Burner Tilting #150 Crucible Furnace for Gas, complete with lining and #7 Blower and motor—220 Volt.
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired.
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired.
1—Aluminum Electric Heat Treating Unit, 75 KW, 220 Volt, Batch Type, with Basket and Quench Tank.
2—Hausfeld Open Flame Tilting Brass Furnaces, 400# capacity, Gas or Oil.
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers.
2—Monarch-Rockwell Rotating, 500# Brass, Oil.
New 32" to 41" Dia. Shell Cupolas made to order.

TUMBLING MILLS AND SAND BLAST
4—New Haven 36" x 46" Self Contained Sand Blast Barrels, Belt Drive.
2—Pangborn Syphon Feed Sand Blast Cabinets.
3—Portable Sand Blast Generator Tanks, 500# Sand Cap.

MISCELLANEOUS
1—Type V Combs Foundry Riddle with motor.
1—Heavy Duty Back Geared Sprue Cutter, 1½" square knives, T. & L pulley drive.
1—No. 1 Blystone Sand Mixer, 7 cu. ft., 5 H.P. 3/60/220-440, motor connected.
6—Worm Geared Tilting Ingot Mold Stands, 6' to 12' long.
7—Hydro-Whirl, Wet Type, Dust Collecting Booths, suitable for Magnesium, Aluminum, Brass, etc, 5' x 3' working table and collecting system built as complete unit.
2—Hydro-Whirl, Wet Type, Collectors for double end grinders.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST.
CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

HINES STANDARD ALUMINUM POP-OFF FLASKS

Sizes—12 x 14, 12 x 16, 14 x 16, 12 x 18, 18 x 35 and 11 x 32
Write us for full information and list of prices.

STEDMAN'S FOUNDRY & MACHINE WORKS
P.O. BOX 209
AURORA, INDIANA

FOR SALE

1—Webb continuous two pass overhead type continuous core oven, 92 ft. long, 9 feet wide, 6½ feet high, gas fired complete with controls, 522 feet of chain and track with motors and blowers. Reasonably priced for prompt sale.

BOX 685
THE FOUNDRY **CLEVELAND 13, OHIO**

FOR SALE

1 model 104 jolt squeeze Milwaukee molding machine.
1 Adams jolt squeeze portable molding machine.
1 International jolt rollover 20 x 24 table.
3 Milwaukee No. 142 jolt squeeze molding machine.

NORTHWEST EQUIPMENT COMPANY
P. O. BOX 73
YAKIMA, WASHINGTON

FOR SALE

Two new machines never used. Johnston & Jennings molding machine #815 and Arcade jolt pin lift machine #5207. Address: Mundle Mfg. Co., Aurora, Ill.

LIQUIDATION SALE

TAKE ADVANTAGE OF THESE TREMENDOUS BARGAINS!

Heat Treating Furnaces and Ovens

1—G. E. HEAT TREATING FURNACE. 600° F TEMP. 210 KW. 13¼' x 6¾' x 7' High.

1—HEAT TREATING OVEN. 800° F. gas and oil fired.

1—KILNTYPE PRE-HEATING & BAKING OVEN (Young Bros.) 3 comp., 3750° F., max. temp.; 4'8" wide, 5'3" deep, 7' high.

1—YOUNG BROS. INDUSTRIAL OVEN. 3 comp., 3 drawer, pull type 7'2" x 7'2" x 23'. Electrically heated to max. of 800° F.

1—DISPATCH OVEN; 600° F. 7½' wide, 18' long, 19' high. Equipped with Ray Oil Burner.

Miscellaneous

1—CLIMAX WIRE STRAIGHTENER. #2A. 3/16" cap.

1—ST. REGIS MAGNESIUM FIRE EXTINGUISHER. complete with compressor and 10 HP 220/440 v. motor.

12—Potentiometers.

Melting Furnaces

1—FISHER STATIONARY OIL FIRED MELT. FURNACE. 200 lb. Crucible.

1—FISHER STATIONARY OIL FIRED MELT. FURNACE. 90 lb. Crucible.

1—FISHER MELT. FURNACE. 2000 lb. Crucible.

1—Fisher Centrifugal Blower.

Impregnating Equipment

1—AUTOCLAVE; Steam jacketed 42" x 60"; 100# pressure and full vacuum. Complete.

1—VACUUM PUMP; Worthington 2 cyl. air cooled V type, 6½" x 6½" x 4".

1—Tung Oil Reservoir.

5—Rinse Tanks.

Foundry Equipment

1—CRUSHER—Natl. Eng. Co. 15" x 12" with 10 HP AC Motor, 440 volts.

16—Hydro-Whirl Grinding Booths.

Molding Machines

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8—PORTABLE JOLT ROLLOVER PATTERN DRAW MACHINES. Johnston & Jennings. #610-B.

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ADVERTISING INDEX

A

Acme Aluminum Alloys, Inc. 189
Acme Foundry Co. 253
Adams Co., The 54, 55
Air Reduction 10
Ajax Electric Co., Inc. 222, 223
Ajax Electric Furnace Corp. 222, 223
Ajax Electrothermic Corp. 222, 223
Ajax Engineering Corp. 222, 223
Ajax Metal Co. 222, 223
Allis-Chalmers Mfg. Co. 21
Alloy Metal Abrasive Co. 257
Alter Co. 254
Aluminum Co. of America 167
American Air Filter Co., Inc. 41
American Bridge Co. 261
American Colloid Co. 145
American Gas Assoc. 37
American Gum Products Co. 264
American MonoRail Co., The 193
American Optical Co. 58
American Smelting & Refining Co., Federated Metals Div. 23
Angell Nail & Chaplet Co. 261
Arcade Mfg. Div., Rockwell Mfg. Co. 156
American Wheelabrator & Equipment Corp. 64, 129, 130, 131, 132
Asbury Graphite Mills, Inc., The 234

B

Baker Perkins Inc. 116
Baroid Sales Div., National Lead Co. 236
Bartlett, C. O., & Snow Co., The 231
Bay State Abrasive Products Co. 109
Beardsley & Piper Co., The 180, 181, 183
Berkshire Mfg. Co. 276
Bethlehem Steel Co. 1
Blaw-Knox Div., of Blaw-Knox Co. 253
Blystone Div., Standard Sand & Machine Co. 254
Bosworth Engineering Co. 254
Bradley Washfountain Co. 200
Brooke E. & G., Iron Co., The 271
Buckeye Products Co., The 258
Buda Co., The 256
Buehler, Ltd. 184
Buffalo Pattern Works 136

C

Campbell-Hausfeld Co., The 186
Cannon Vibrator Co. 276
Carbon Limestone Co., The 276
Carborundum Co., The 44, 60, 298
Carl-Mayer Corp., The 245
Carman, Edwin C., Inc. 276
Centrifugal Casting Machine Co. 271
Certified Core Oil Div., Socony-Vacuum Oil Co., Inc. 135
Champion Foundry & Machine Co. 8, 9
Chicago Mfg. & Distributing Co. 25
Chisholm-Moore Hoist Corp. 61
Christiansen Corp. 165
Clearfield Machine Co. 241
Cleco Pneumatic Tool Div. of the Reed Roller Bit Co. 34
Cleveland Chaplet & Mfg. Co. 277
Cleveland Flux Co., The 203
Cleveland Metal Abrasive Co., The 259
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. 235
Cleveland Vibrator Co. 22
Columbia Steel Co. 261
Combined Supply & Equipment Co., Inc. 267
Construction Machinery Co. 265
Coremakers, Inc., The 173
Corn Products Sales Co. 153
Crobaugh, Frank L., Co., The 268
Crucible Manufacturers Assoc. 208

D

Dallet Co., The 43
Davenport Machine & Foundry Co. 62
Davis Fire Brick Co., The 258
Dayton Oil Co., The 220
Dayton Pneumatic Tool Co. 264
DeBardeleben Coal Corp. 278
Delta Oil Products Co. 12
Demmler, Wm., & Bros. 56, 264
Despatch Oven Co. 233
Detroit Electric Furnace Div., Kuhlman Electric Co. 199
Diamond Clamp & Flask Co. 42
Dietert, Harry W., Co. 50
Dings Magnetic Separator Co. 190
DoAll Co., The 113
Dougherty Lumber Co. 234
Dravo Corp. 243

E

Eastman Kodak Co., X-Ray Div. 141
Economy Tool & Machine Co. 274
Electric Furnace Co., The 107
Electric Storage Battery Co., The 123
Electro Metallurgical Co. 57
Electro Refractories & Alloys Corp. 266
Empire Varnish Co., The Waterlox Div. 274
Erie Steel Construction Co. 242

F

Fabreeka Products Co., Inc. 219
Federal Foundry Supply Co., The 2, 267
Fisher Furnace—Division of Lindberg Engineering Co. 11
Foundry Equipment Co., The 158, 159
Foundry Services Inc. 274
Fox Grinders, Inc. 258
Foxboro Co., The 52
Freeman Supply Co., The 201
Fremont Flask Co., The 237
Fuller Co. 210

G

Gardner-Denver Co. 32
General Blower Co. 18
General Electric Co. 35
Giffels & Vallet, Inc. 171
Globe Iron Co. 260
Globe Steel Abrasive Co. 279
Great Western Mfg. Co. 204

H

Hauck Mfg. Co. 276
Haynes Foundry Equipment Co. 266
Herman Pneumatic Machine Co. 217
Heston & Anderson, Div. of St. Paul Foundry & Mfg. Co. 278
Hewitt-Robins Inc. 121
Hickman, Williams & Co. 273
Hines Flask Co., The 30, 31
Hough, Frank G., Co., The 59
Hudson Coal Co., The 265

I

Illinois Testing Laboratories, Inc. 177
Imperial Belting Co. 248
Industrial Equipment Co. 260
Industrial Fabricating, Inc. 20
Industrial Silica Corp. 198
International Molding Machine Co. 138, 139
International Nickel Co., Inc., The 19, 103
International Paper Co. 249
Ironton Fire Brick Co., The 38

J

Jackson Iron & Steel Co., The 275
Jeffrey Mfg. Co., The 14
Johns-Manville 224
Johnston & Jennings Co., The 225
Joy Mfg. Co., Sullivan Div. 51

K

Keokuk Electro-Metals Co. 211
Kirk & Blum Mfg. Co., The 227
Knight, Lester B., & Associates Inc. 133
Krause, Chas. A., Milling Co. 115

(Continued on page 300)

ADVERTISING INDEX

L

Lanly Co., The 247
Lindberg Engineering Co. 11
Linde Air Products Co., The 26
Link-Belt Co. ..... Back Cover
Logan Co., Inc. 127

M

Mall Tool Co. 260
Marshall, L. H., Co. 255
Master Pattern Co. 197
Mathieson Alkali Works (Inc.) The ..... Inside Front Cover
Miller-Taylor Tool Co. 218
Milwaukee Chaplet & Mfg. Co. 202
Milwaukee Foundry Equipment Co. 154
Mine Safety Appliances Co. 206
Modern Equipment Co. ..... Front Cover, 302
Moline Iron Works 255
Molybdenum Corp. of America 207
Morrison Engineering Corp. 257
Moulders' Friend, The 275
Murphy, Jas. A., & Co. 256, 272

N

National Engineering Co. 48, 49
National Lead Co. 236
National Metal Abrasive Co. 273
National Pigment Co. 63
Neff & Fry Co., The 256
Newaygo Engineering Co. 209
Newcomb-Detroit Co. 168
New Haven Vibrator Co. 278
Nicholls, Wm. H., Co., The 195
Northern Engineering Works 170
Norton Co. 143

O

Oliver Machinery Co. 266
Osborn Mfg. Co., The 148, 149
Ottawa Silica Co. 196

P

Pangborn Corp. 6, 7, 15, 163
Parks Woodworking Machine Co., The 271
Peninsular Grinding Wheel Co. 28, 29
Penn Iron Works 274
Permanente Metals Corp. 24
Pickands Mather & Co. 185
Pioneer Mfg. Co. 250
Pittsburgh Crushed Steel Co. 263
Pittsburgh Lectromelt Furnace Corp. 36
Pittsburgh Metals Purifying Corp. 259
Plaster Process Castings Co. 239
Porbeck Mfg. Co. 238
Precision Scientific Co. 276
Pressure Cast Products Corp. 263
Producers Core Sand Corp. 278
Propellair, Inc. 212
Putnam, A. H., Co. 278
Pyrometer Instrument Co., The 272

R

Radium Chemical Co., Inc. 277
Ransohoff, N., Inc. 146
Reading Chain & Block Corp. 252
Redford Iron & Equipmnt Co. 175, 262
Republic Steel Corp. 45
Robeson Process Co. 264
Robins Conveyors Div., Hewitt-Robins Inc. 121
Robinson Clay Product Co., The 215
Roots-Connersville Blower Corp. 172
Rotor Tool Co., The 39
Royer Foundry & Machine Co. 229

S

Schmieg Industries Inc. 265
Schneible, Claude B., Co. 53
Schramm, Inc. 176
Scientific Cast Products Corp., The 244
Screen Equipment Co., Inc. 194
Semet-Solvay Co. 232
Silent Hoist & Crane Co. 236
Simonds Abrasive Co. 33
Simplicity Engineering Co. 178
Sly, W. W., Mfg. Co., The 111
Smillie, C. M., & Co. 275
Smith Oil & Refining Co. 213
Smith & Richardson Mfg. Co. 262
Smith, Werner G., Co., The 4, 5
Smooth-On Mfg. Co., The 262
Socony-Vacuum Oil Co., Inc., Certified Core Oil Div. 135
SPO Inc. 221
Standard Conveyor Co. 179
Standard Electrical Tool Co., The 272
Standard Silica Corp. 276
Stearns Magnetic Mfg. Co. 228
Steel Shot & Grit Co. 263
Sterling Grinding Wheel Div., The, of The Cleveland Quarries Co. 151
Sterling Wheelbarrow Co. 40
Stevens, Frederic B., Inc. Inside Back Cover
Strand, N. A., & Co. 232
Stroman Furnace & Engineering Co. 27
Swan-Finch Oil Corp. 301
Syntron Co. 246

T

Tabor Mfg. Co., The 16, 17
Tamms Silica Co. 238
Timken Roller Bearing Co., The 47
Tonawanda Iron Corp. 46
Truscon Steel Co. 267

U

Union Carbide & Carbon Corp. 26, 57
United Compound Co. 279
United Pattern Works 268
United States Electrical Tool Co., The 182
United States Graphite Co., The 205
United States Gypsum Co 187
United States Rubber Co. 169
United States Export Co. 261
United States Steel Corp., Subsidiaries 261
Universal Engineering Co. 124

V

Vanadium Corp. of America 119
Vincent Steel Process Co. 273
Vonnegut Moulder Corp. 279

W

Wade, F. G., Inc. 116
Wadsworth Equipment Co. 161
Wellman Bronze & Aluminum Co., The 277
Wellman Engineering Co., The 278
Wellman Products Co., The 214
Western Metal Abrasive Co. 273
Wheland Co., The 273
Whiting Corp. 13
Wickland, A. A., & Co. 191
Willson Products Co., The 166
Wolverine Chemical Co. 272
Woodward Iron Co. 105
Wrigley, Wm., Jr., Co. 226

Y

Young Brothers Co. 251

Table of Contents 3

Classified Advertisers, Pages 291, 292, 293, 294, 295, 296, 297

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The drawings on this page illustrate the basic operating methods and structural principles of MODERN Multiple Cupola Chargers . . . pioneered and developed by Modern Equipment Co.

Call your MODERN representative for counsel and service on your charging and handling operations . . . or Write for Bulletin 143A.

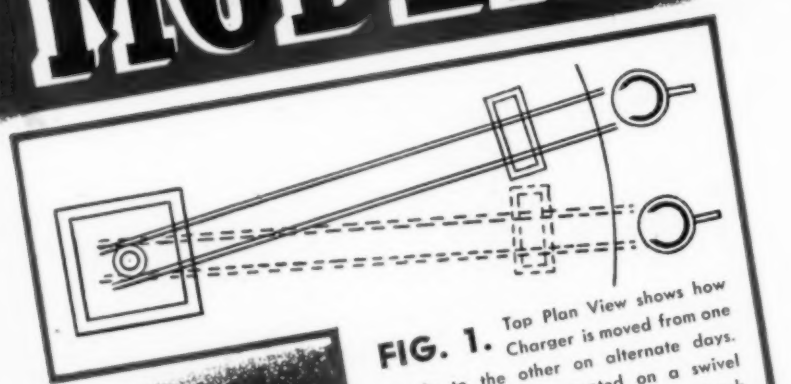


FIG. 1. Top Plan View shows how Charger is moved from one cupola to the other on alternate days. Charger frame is mounted on a swivel base below weigh hopper, and a truck which rolls on a curved track segment, in this case, at the charging door level. Charger is propelled mechanically.

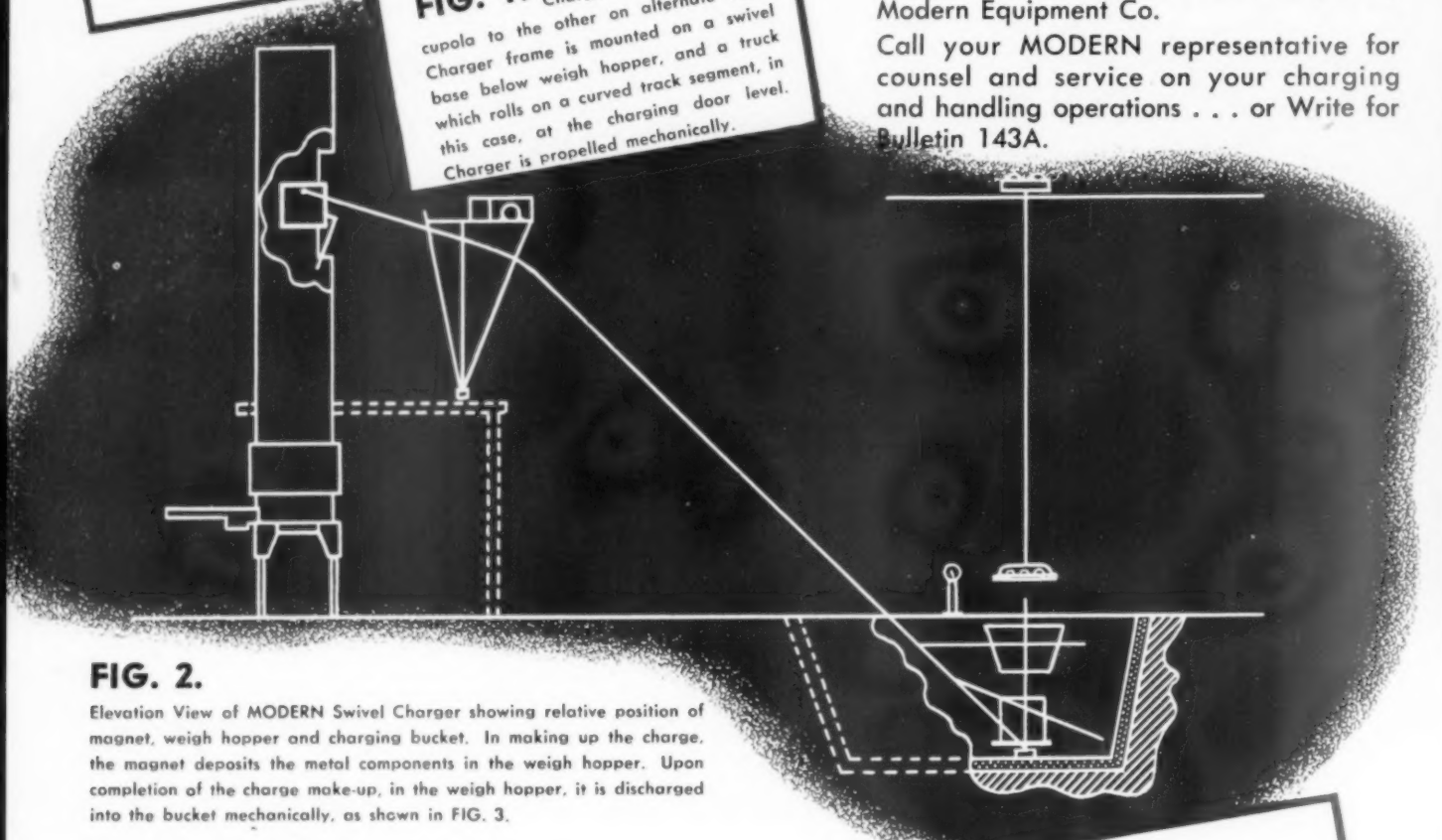
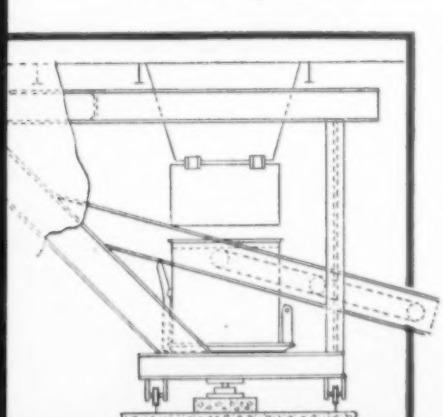


FIG. 2.

Elevation View of MODERN Swivel Charger showing relative position of magnet, weigh hopper and charging bucket. In making up the charge, the magnet deposits the metal components in the weigh hopper. Upon completion of the charge make-up, in the weigh hopper, it is discharged into the bucket mechanically, as shown in FIG. 3.



◀ FIG. 3.

Shows weigh hopper supported on a scale for accurate weighing of charge components. The complete charge is deposited in the bucket by release of bottom doors of weigh hopper through air or oil control. Bucket is then hoisted to cupola on the I-Beam tracks and discharged as shown in FIG. 4.

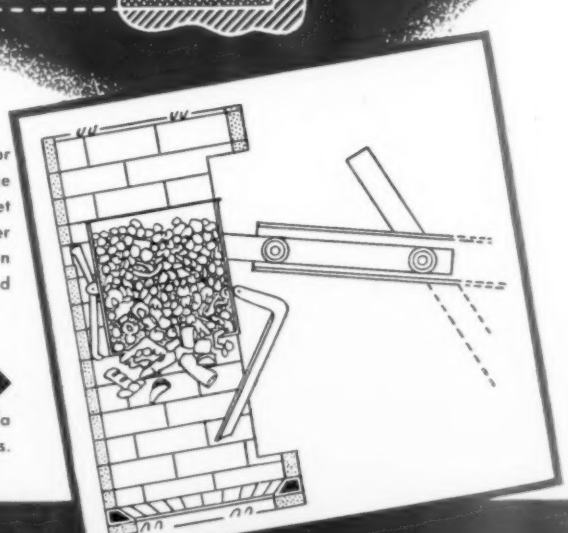


FIG. 4. ▶

Drop Bottom Bucket discharging into cupola after being hoisted on inclined I-Beam tracks.

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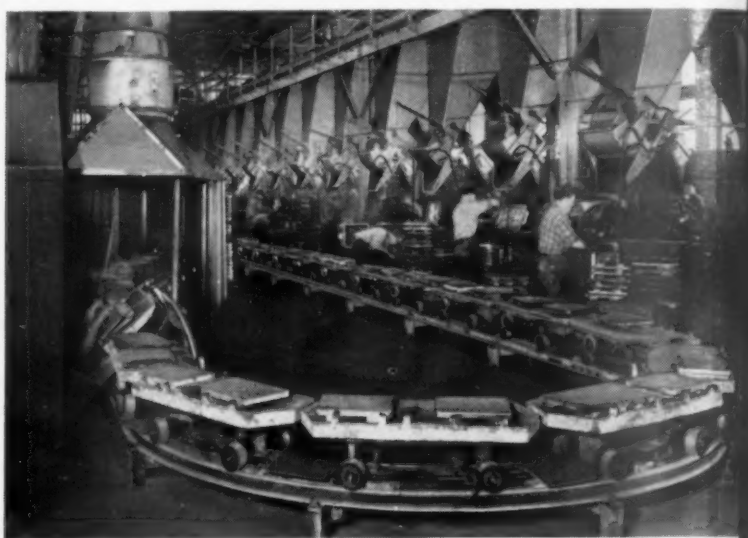

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